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ANNOUNCEMENT OF THE TWENTY-THIRD SUMMER SESSION JULY 6—AUGUST 14 1914

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This announcement is intended to give detailed information to prospective students in the Summer Session of Cornell University.

For general information concerning the University and the work in its various colleges during the academic year, the requirements for admission, etc., the General Circular of Information should be consulted. This and the other Official Publications of Cornell University are listed on the last page of the cover of this pamphlet. Any one of the informational publications there mentioned will be sent gratis and post-free on application to the Secretary of Cornell University, Ithaca, New York.

CALENDAR

SUMMER SESSION 1914

In order to get the full number of exercises announced for the Summer Session, it is necessary that all work begin promptly on Monday morning, July 6. Students are, therefore, urged to reach Ithaca in time to be present at the first exercises in each class. If possible, they should register on Saturday, July 4; if not, they should register on Monday during the hours not occupied in class work.

July 4, Saturday,	1 to 5 p. m. Registration at office of Registrar.
July 6, Monday,	Instruction begins at times and places announced under each course. Registration continued.
July 7, Tuesday evening, and following Tuesdays,	Musical Recital, Sage Chapel. The Director of the Summer Session will make a brief address.
July 8, Wednesday evening, and following Wednesdays,	Departmental Conferences.
July 9, Thursday evening, and following Thursdays,	Musical Recital, Auditorium, College of Agriculture.
July 11, Saturday before 1 p. m.	Last day for payment of fees at the Treasurer's Office, 1 Morrill Hall. Excursions as announced in the weekly calendar.
July 13, Monday evening,	First Lecture in Monday evening course. Continued on following Mondays. Rockefeller Hall.
August 13, 14, Thursday and Friday,	New York State Examinations for Teachers' Certificates.
August 14, Friday,	Summer Session closes.

DAILY NEWSPAPER

The Cornell Daily Sun, the regular daily paper through the University year, is issued during the Summer Session each week day morning. This contains the official weekly calendar of all University events, and official notices of interest to students are published in it. The full registration list will be printed in the early numbers. The paper will give full reports of all lectures of general interest and of other matters in the University community.

CORNELL UNIVERSITY SUMMER SESSION 1914

OFFICERS

Jacob Gould Schurman, LL.D., President of the University.
George Prentice Bristol, A.M., Director of the Summer Session.
David Fletcher Hoy, M.S., Registrar of the University.

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John Joseph Kennedy, B. Chem., Assistant in Chemistry. Chemistry
Olney Brown Kent, B.S., Instructor in Poultry Husbandry. Poultry Husbandry
Dexter S. Kimball, A.B., Professor of Machine Design. Industrial Education
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Helen Knowlton, A.B., Instructor in Home Economics. Home Economics
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George N. Lauman, B.S.A., Professor of Rural Economy. Rural Economy
Burton Judson Lemon, Ph.D., Instructor in Chemistry. Chemistry
Gustav E. F. Lundell, Ph.D., Assistant Professor of Chemistry. Chemistry
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Samuel A. Mahood, M.A., Instructor in Chemistry. Chemistry
James F. Mason, Ph.D., Assistant Professor of Romance Languages. French
Peter A. van der Meulen, B.Chem., Assistant in Chemistry. Chemistry
Victor Elvert Monnett, Instructor in Geology. Geology
Benton Sullivan Monroe, Ph.D., Assistant Professor of English. English
Frederick Monteser, Ph.D., Head of Department of German, DeWitt Clinton High School, New York City. German
Guy Brooks Muehmore, A.B., Assistant Professor of Oratory. Oral English
Hilda Murray, Teacher in Graystoke Day Training College, London, England. Physical Education
Everett Ward Olmsted, Ph.D., Professor of Romance Languages. French
William Ridgeley Orndorff, Ph.D., Professor of Organic Chemistry. Chemistry
Oliver Ralph Overman, A.M., Assistant in Chemistry. Chemistry
Frederick William Owens, Ph.D., Instructor in Mathematics. Mathematics
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Irving Perrine, Ph.D., Professor of Geology, University of Oklahoma. Geology
Horace M. Pickerell, B.S. in Agr., Instructor in Dairy Industry. Dairy Industry
Miles A. Pond, Ph.B., Ass't. Professor of Civil Engineering. Descriptive Geometry
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Arthur Benning Ray, M.A., Assistant in Chemistry. Chemistry
Gilbert J. Raynor, A.M. Commercial High Sch., Brooklyn. Commercial Education
Harry Westfall Redfield, Ph.D., Instructor in Chemistry. Chemistry

Hugh Daniel Reed, Ph.D., Assistant Professor of Zoology. Zoology
Ernest W. Rettger, Ph.D., Assistant Professor of Applied Mechanics. Mechanics
Frank E Rice, A.B., Instructor in Agricultural Chemistry. Agricultural Chemistry
James Edward Rice, B.S.A., Professor of Poultry Husbandry. Poultry Husbandry
Floyd Karker Richtmyer, Ph.D., Assistant Professor of Physics. Physics
William Albert Riley, Ph.D., Professor of Insect Morphology and Parasitology. Entomology
Flora Rose, B.S., M.A., Professor of Home Economics. Home Economics
Harold Ellis Ross, M.S.A., Professor of Dairy Industry. Dairy Industry
Martin Wright Sampson, M.A., Professor of English. English
Elmer Seth Savage, Ph.D., Professor of Animal Husbandry. Animal Husbandry
Burton T. Scales, Teacher of Music, Penn Charter School, Philadelphia. Music
Francis J. Seery, B.M.S., Assistant Professor of Civil Eng. Hydraulics
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Virgil Snyder, Ph.D., Professor of Mathematics. Mathematics
Samuel Newton Spring, B.A., M.F., Professor of Forestry. Forestry
Stella Stark, Supervisor of Music, Buffalo, N. Y. Music
Benjamin Franklin Stelter, Ph.D., Instructor in English. English
Anna Clegg Stryke, A.B., Instructor in Entomology. Entomology
Sheila Sutherland, Teacher in Graystoke Day Training College, London, England. Physical Education
Newton Swift, Teacher of Piano and Theory, Boston, Mass. Music
Bertha Estelle Titsworth, Instructor in Home Economics. Home Economics
Hugh Charles Troy, B.S.A., Professor of Dairy Industry. Dairy Industry
John R. Turner, M.S., Assistant Professor of Economics. Economics
Edward M. Tuttle, B.S.A., Instructor in Rural Education. Education
Elizabeth Undritz, A.M., Instructor in German, Illinois College. German
Leonard Church Urquhart, C.E., Instructor in Civil Engineering. Engineering
James Elijah Vanderhoef, Foreman in Foundry. Manual Training
Martha Van Rensselaer, A.B., Professor of Home Economics. Home Economics
Herbert Hunter Vaughan, Ph.D., Instructor in Romance Languages, University of Pennsylvania. Spanish
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Oscar Diedrich von Engeln, Ph.D., Assistant Professor of Geography. Geography
Albert Edward Wells, Superintendent of Shops. Industrial Education
Thomas W. B. Welsh, Ph.D., Instructor in Chemistry. Chemistry
Bernice White, Teacher of Music in the Normal College, New York City. Music
Karl McKay Wiegand, Ph.D., Professor of Botany. Botany
Mrs. Maude Cipperly Wiegand, A.B., Instructor in Botany. Botany
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Wilford Murray Wilson, M.D., Professor of Meteorology. Meteorology
Harry Elmsley Wood, Director of Manual Training, Indianapolis, Ind. Industrial Education
James Albert Woodburn, Ph.D., Professor of American History and Politics, Indiana University History and Government
Paul Work, A.B., M.S. in Agr., Instructor in Vegetable Gardening. Gardening
George A. Works, M. A., Professor of Rural Education. Rural Education
Albert Hazen Wright, Ph.D., Instructor in Zoology. Zoology
Wesley Daniel Zinnecker, Ph.B., Instructor in German. German

OBJECT OF THE SUMMER SESSION

The primary object of the Summer Session is to advance education by helping those engaged in it. The instruction is adapted to the needs of the following classes:

1. Professors and teachers in colleges and schools, superintendents, and supervisors of special branches of instruction.

The announcements of the different departments show a wide range of work. This work is either advanced and, therefore, suited for specialists who wish to pursue their individual study, or more elementary and adapted to teachers who desire to start in a new field. In addition to the instruction of the class room, the University's libraries, laboratories, and shops are open for use. For superintendents and supervisors, there are also courses in administration, and in general and special methods, besides lectures on educational philosophy and theory.

2. College students in Cornell or other universities who wish to use some of the "long vacation". In the case of graduates some of the work offered may be counted toward an advanced degree. Undergraduates may anticipate work and thereby shorten their course, or may make up existing deficiencies. The conditions for receiving credit, and the amount which may be obtained, are stated on pages 7, 8.

3. Students entering the University and wishing to obtain surplus credit at entrance, or to complete the entrance requirements. It often happens that students have in June more or less than the requirements for admission to college. The Summer Session affords them the opportunity either to add to their surplus and thus, in some cases, to gain a year in time; or to make up their deficiency.

4. All persons qualified to pursue with profit any course given, whether or not they are engaged in study or teaching.

STATISTICS OF ATTENDANCE, 1913

The whole number enrolled in the Summer Session of 1913 was 1097 (601 men and 496 women), representing 48 states and territories and 25 foreign countries. Of this number 411 were students during the previous winter; 598 were persons engaged in teaching, of whom 42 were teachers in colleges, 21 in normal schools, 186 in high schools, 236 in grammar schools, 23 in private schools, and 90 were supervisors or superintendents.

ADMISSION, ATTENDANCE, REGISTRATION

There is no examination for admission to the Summer Session. Each person must, however, satisfy the instructor in charge of any course (unless it be elementary) that he is qualified to pursue the work. Any duly registered student of the Summer Session may visit such classes as he desires. **Admission to the class rooms is restricted to duly registered students.** Persons wishing to have work done during the Summer Session counted towards a degree, must conform to the regulations stated under the heading "Credit for Work," page 7.

All students are required to register at the office of the Registrar in Morrill Hall. They may register on Saturday, July 4th, between 1 p. m. and 5 p. m., or upon the day of their arrival, if they reach Ithaca later than July 4th. Registration on July 4th is urged. Class exercises begin at 8 a. m. Monday, July 6th. The Registrar's office is open from 9 a. m. to 4 p. m. every day except Saturday, when it is closed at noon. Open Saturday, July 4, 1–5 p. m.

TUITION FEE

The single tuition fee with the exceptions noted below, for the entire Summer Session, whether one course or more be taken, is $30. This must be paid at the office of the Treasurer, Room 1, Morrill Hall, within five days after registration day. In case of withdrawal, within five days from the first registration day, for reasons satisfactory to the Treasurer and the Registrar, the tuition paid may be refunded and the charge cancelled. In case of withdrawal within two weeks after the first registration day, one-half the tuition may be refunded. In case of registration after the first three weeks of the session, students must pay two-thirds of the full tuition fee. No student is admitted without the payment of this fee. Sibley College students taking shop work are not exempted. Admission to classes is restricted to duly registered students.

For instruction in swimming and fencing an extra fee is charged. See p. 14.

Tuition in all subjects taught in the College of Agriculture, see the courses on pages 56 to 68, is provided by the State of New York and is free to *residents of this State*. For all others the charge is the same as for other work, $30. Free tuition does not include any instruction outside the College of Agriculture, nor are students receiving free tuition permitted to attend classes outside the College of Agriculture.

LABORATORY FEES

Chemistry. A fee is charged for material actually consumed, and such deposit must be made with the Treasurer as the instructor may prescribe.

Physics. In this department the fee is at the rate of $1 for every five hours a week of work in the laboratory. The entire amount must be paid to the Treasurer at the beginning of the session.

Geography and Geology. In courses B and D in geography a fee of $1 each must be paid in advance to the Treasurer to cover incidental expenses of the course.

Shopwork. The fee for shopwork is at the rate of $1.50 for every fifty hours spent in the shops. This must be paid in advance to the Treasurer. Students registered in Sibley College during the previous year are not required to pay this fee.

Zoology. See courses under Zoology, page 52.

Library Deposit. See under Library, page 9.

ACADEMIC CREDIT FOR WORK

In the College of Arts and Sciences. The requirements for the degree of Bachelor of Arts are residence for eight terms (four years), and the completion

of one hundred twenty hours ("points") of elective work. A student who has satisfied the entrance requirements of the College, and has afterward completed in two or more summer sessions at least twelve hours of work in courses approved by the departments concerned, may be regarded as having thus satisfied one term of residence. Under no circumstances shall work done in summer sessions be accepted as the equivalent of more than two terms of residence. The maximum amount of credit towards the A.B. degree which is allowed for the work of any one summer session is seven hours.

In Other Colleges of the University. The nature and amount of credit allowed in these for summer session work may be learned from the statements under the announcement of each course.

In the Graduate School. Graduate work at Cornell is not expressed in terms of courses or hours. A graduate of any college whose requirements for a first degree are substantially equivalent to those for the first degree at Cornell may be admitted to resident study in the Graduate School. He may be admitted to candidacy for an advanced degree upon the recommendation of the professors under whom he proposes to work. The conferring of the degree itself does not depend primarily on the completion of any prescribed number of courses or of a fixed term of residence. It involves the writing of a thesis and the passing of a special final examination. The minimum period of residence for the Master's degree is one academic year or its equivalent, and for the Doctor's degree three years.

Not all work done by a graduate student is graduate work in the strict sense of the term. Graduate work to be considered as work for a degree must be of advanced character in some field or department of knowledge.

Graduate work toward an advanced degree may be done during the Summer Session under the following conditions: it must be done under the direction of a member of the Faculty of the Graduate School after the student has entered the Graduate School and is admitted by the Dean of the School as a candidate for an advanced degree. The residence requirement for the Master's degree may be satisfied by study during five Summer Sessions, or by study during one-half the academic year and in three Summer Sessions.

The graduate work offered in the summer of 1914 may be learned from the departmental announcements. Not all departments offer graduate work.

Any person wishing to become a candidate for an advanced degree and to study during the Summer Session should write to the professor whose work he expects to take, and also to the Dean of the Graduate School, asking for a blank form of application for admission to the Graduate School. It is much better to make these arrangements before coming to Ithaca, thus avoiding delay and interruption of study after the Summer Session has begun.

Certificates for Work Done. Students of the Summer Session who are not matriculated in the University may receive certificates of attendance and of work satisfactorily performed. Application for them must be made before August 14, and the applicant must leave at the office of the Registrar a large sized envelope stamped and directed to his home address. The certificate will then be forwarded by mail. The regulations of each department for the granting of a certificate must be met.

The Department of Education of New York City will, in certain subjects accept these certificates instead of requiring examinations for licenses.

COST OF LIVING

The cost of board and furnished room in Ithaca during the Summer Session runs from $6 a week upwards. In some cases the cost has been reduced to $5 but it is not safe to count upon less than this sum.

The price of a single furnished room may be as low as $1.50 a week. The prices advance with the size and location of the rooms.

Rooms are engaged with the understanding that they will be occupied for the entire session, unless otherwise agreed upon by both parties. Table board is usually engaged by the week, or, if so stated, by the day.

The price of table board runs from $4.50 to $6 in boarding houses. In cafeterias and restaurants, the average cost of meals would amount to about the same sum.

RESIDENCE HALLS FOR WOMEN

The university has two residence halls for women only in which rooms and board are furnished during the Summer Session.

Rooms in these buildings will be reserved in the order of application. Every application for a room to be reserved must be accompanied by a deposit of $5, otherwise the application is not registered. The amount of this deposit is deducted from the rent, if the room assigned be occupied by the applicant; it is refunded, if the applicant gives formal notice to the manager on or before June 15 that she wishes to withdraw her application altogether.

Sage College, opened in 1875, will be reserved in the Summer of 1914 for the use of the women students in the Department of Music, and the charge for room, table board, and a specified amount of laundry during the Session will be from $48 to $60 according to the size and location of the room.

Prudence Risley Hall, opened in 1913, is reserved for women students in the Summer Session at a uniform charge of $54 for the Session.

In both buildings the charge includes lodging from Friday night, July 3d (not earlier), and meals up to and including breakfast, Saturday, August 15.

For plan of buildings and all information apply to Thomas Tree, Manager, Cornell University, Ithaca, N. Y.

THE LIBRARIES

The University Library is open on week days from 9 a. m. to 10 p. m., except Saturday, when it closes at 1 p. m. In this are located the main library, containing about four hundred thousand volumes, and most of the seminary and special libraries. The main reading room affords accommodations for over two hundred readers, and contains a selected library of over 8 000 volumes of reference works. Adjacent to it is the periodical room in which are kept the current numbers of about five hundred journals in various fields of knowledge. These rooms are open to all students. Students properly qualified are allowed the use of the seminary rooms and of the books in them. The main collection is primarily a library of reference for use in the building. Students are, however, allowed to a limited extent to take out books for home use. Persons wishing this privilege must make a deposit of $5, which will be refunded upon the return of all books taken out. Special libraries of chemistry, in Morse Hall, and of anatomy and physiology, in Stimson Hall, are open to students in these departments.

The Library of the College of Agriculture, on the first floor of the main building, is open on week days from 9 a. m. to 5 p. m., except Saturday, when it closes at 1 p. m. In it will be found a large collection of bulletins and reports of experiment stations, reference books on agriculture and country life, agricultural periodicals, and the like. The entomological library, in the Department of Entomology on the fourth floor of the main building, is one of the most complete of its kind in the United States. Nearly all the departments in which instruction is given have well-selected departmental libraries.

LECTURES, MUSICAL RECITALS, EXCURSIONS

In addition to the regular class room work there will be public lectures on Monday evenings. In 1914 the subjects will be in the field of Biology with particular reference to public hygiene and sanitation, and their relation to schools.

There are also lectures of general interest each week in connection with the various departments. Notice of these will be given in the University Calendar.

Musical recitals will be given on Tuesday and Thursday evenings alternately in the Sage Chapel and the new Auditorium.

Wednesday evenings are devoted to the departmental conferences which are open to all interested. Notice of these will be given from week to week.

In connection with the work of several departments excursions are made to many points of interest. Most of these are open to members of the Summer Session. Notable for their attraction are the excursions to Watkins Glen and to Niagara Falls.

RAILROAD ROUTES AND RATES

Ithaca is reached by either the Lehigh Valley or the Lackawanna railroad. By the latter, a branch leaves the main line at Owego. Through trains run from New York and Buffalo on the Lehigh, and through sleeping cars run daily from New York on both roads. From Philadelphia, and from Baltimore, Washington, and the South via the Baltimore & Ohio, the Philadelphia & Reading connects with the Lehigh at Bethlehem. On the Lehigh, through trains for Ithaca connect with the New York Central at Auburn, and with the Pennsylvania (Northern Central) and the Erie at Elmira.

From nearly all important points in the Middle and Atlantic Coast States summer excursion tickets may be purchased at Ithaca. From central and western states it is generally possible to buy excursion tickets to Niagara Falls, in case an excursion rate to Ithaca is not available.

At the time this pamphlet goes to press it is not possible to give specific rates. Persons interested should, some time in advance of their departure, make inquiry of the railroad agent at their home town. If full information cannot be obtained in this way, write to the Director of the Summer Session, Ithaca, New York.

COURSES OF INSTRUCTION

Most of the courses offered consist of five exercises a week, each week day except Saturday. The number of actual hours of class work in any course may be found by multiplying the number of weekly exercises by six.

The word "hour" used in speaking of University credit means the equivalent of one class exercise a week for a half year. One hundred and twenty such "hours" are required of candidates for the A.B. degree.

(G. S. = Goldwin Smith Hall.)

EDUCATION

Courses A, B, and C, will be found especially helpful to college graduates who are preparing for examination in professional subjects as outlined in the New York State Syllabus and Course of Study for the renewal of the College Graduate Certificate Limited. The State Education Department will hold an official examination for such candidates at Ithaca, August 13 and 14. Since it is permissible to do so, those who can should prepare for examination in two subjects this summer and for the remaining two a year later.

A. **Principles of Education.** Lectures, discussions, and textbook study. Professor DEGARMO. Except Sat., 11. G. S. 142. Credit, two hours.

This course is designed to be an introduction to the general theory of education, and falls into three distinct parts, the first pertaining especially to education as an agency for securing individual and social progress; the second, to the school studies, their value and their organization into curricula for cultural and for vocational ends; and the third, to the scientific methods of teaching them. The following are some of the leading topics: educational aspects of prosperity; health; political and economic democracy; home life; race improvement; social adjustment and individual and social progress; the social and the individual basis of education; the basis for the selection of studies; their classification; their function and relative educational worth; the mental discipline that each should furnish; the organization of the studies into curricula; the correlation of high-school studies; general vs. vocational courses of study; scientific basis for high-school methods; function of authority, observation and experiment, of hypothesis and analogy in getting and explaining facts; nature and function of the 'problem'; nature and place of induction and deduction in teaching; the means for securing efficiency; function of the laboratory and workshop; heuristic methods; German methods. Scope and nature of æsthetics in the public schools. Textbooks: DeGarmo's Principles of Secondary Education, vols. I and II; collateral reading: Principles of Education by Henderson, by Bolton, and by Roediger, respectively. Also, for elementary teachers, Bagley's Educative Process and Strayer's Teaching Process. Reference books: The McMurry Series for elementary teachers, and for secondary teachers, the Macmillan and the Longmans Series on the teaching of the respective subjects. As far as issued these are as follows:

1. The Macmillan Series: 1. English. Percival Chubb. 2. Mathematics. David Eugene Smith. 3. Physics. C. R. Mann. 4. Biology. Ganoung.

2. The Longmans Series: 1. English. Carpenter, Baker, and Scott. 2. Latin and Greek. Bennett and Bristol. 3. Mathematics. J. W. A. Young. 4. Physics and Chemistry. Smith and Hall. 5. History and Civics. Henry E. Bourne. 6. Biology. Lloyd and Bigelow.

B. **History of Education.** Lectures, discussions, textbooks, and prescribed readings. Professor DEGARMO. Except Sat., 9. G. S. 256. Credit, two hours.

This is a course in historical interpretation. It is based upon the development of thought and institutions, and the significance of each aspect is estimated from its bearings upon the educational problems of the present. Special emphasis is placed upon the following topics: the education of the Greek people and its bearings upon the questions of cultural and vocational education today; the rise, development, and spread of humanism in Italy, Germany, Great Britain, and the United States, with an estimate of the scope and significance of present-day humanistic training; an account of the rise and development of science and scientific method in modern education; the doctrines of educational reformers, with comparisons, as of Froebel and Montessori, Herbart and Froebel, etc.; the development of modern systems of education in Europe and the United States, with an account of the most important phases of vocational education and of the efforts of the public school to adapt itself to them. Recommended textbooks: 1. General: Monroe, Graves, Davidson, Painter. 2. Special: Davidson, *Education of the Greek People, Rousseau;* Quick, *Educational Reformers;* DeGarmo, *Herbart and the Herbartians;* Hughes, *Loyola;* Bowen, *Froebel;* Laurie, *John Amos Comenius;* Hoyt, *Studies in the History of Modern Education.*

C. **Educational Psychology.** Lectures, discussions, and readings. Professor HILL. Except Sat., 10. G. S. 256. University credit, two hours.

The lectures present a system of functional psychology as applied to education, with particular reference to such topics as nervous plasticity, habit, attention and interest, instinctive response, the nature of educational training and discipline, association, perception, observation, memory, imagination, conception, judgment, and reasoning. Where feasible, psychological experiments that apply to the work in hand are described or performed. Students will need for class room use Whipple's Questions in General and Educational Psychology (Cornell Study Bulletins for Teachers, No. 3, C. W. Bardeen, Syracuse, N. Y.), and will find it advisable for outside reading to purchase James's Talks to Teachers on Psychology, Henry Holt & Co., and Kirkpatrick's Fundamentals of Child Study, The Macmillan Co. Students who have had no previous work in psychology are advised to take Psychology course A also.

D. **School Hygiene.** Lectures, discussions, and readings. Professor HILL. Except Sat., 11. G. S. 256. University credit, two hours.

This course is designed to afford immediate practical assistance to all teachers, to enable them to secure and maintain hygienic conditions of instruction and to coöperate intelligently in the vitally important movement for the conservation of public health. The course has also been designed to supply superintendents with a program of work which they may follow in extending a knowledge of school hygiene among their own teachers. Attention will be paid to the schoolhouse site and grounds, the form and size of the schoolroom, illumination, heating and ventilating, sanitation, school desks, the hearing and vision of school children, the hygiene of the mouth, throat, and nose, the hygiene of reading and

of writing, school diseases and accidents, sex hygiene, fatigue and overpressure, and the nature, value, and methods of medical inspection. The work will be illustrated by numerous demonstrations and opportunity will be given for practice in conducting special tests of the sense-organs. Students will need for classroom use Whipple's Questions in School Hygiene (Cornell Study Bulletins for Teachers, No. 4, C. W. Bardeen, Syracuse, N. Y.).

E. **Mental and Physical Tests of School Children.** Laboratory exercises, lectures, readings, and discussions. Professor HILL and Miss CURTIS. Except Sat., 2–4.30. G. S. 248. Credit, two hours.

This work is planned to familiarize teachers and superintendents with the purposes, methods, and results of conducting mental and physical tests, and is particularly recommended to those interested in special classes for defectives, backward, or talented children. It affords practice in the use of the recently developed scales for measuring performance in arithmetic, writing, and English composition, also in the use of the Binet-Simon diagnostic tests of intelligence, of Healy's tests for mental classification, and of numerous other scientific measurements of efficiency, e. g., tests of vision, hearing, strength, endurance, range of attention, suggestibility, inventiveness, ability to learn, to report, etc. Some acquaintance with general psychology is presupposed. The work is based on Whipple's Manual of Mental and Physical Tests.

Approximately the first half of the course will be devoted to drill work for the purpose of acquiring familiarity with the technique of mental tests and with statistical methods of handling data. In the second half of the course the chief emphasis will be laid upon the use of diagnostic tests of mental status, and here the laboratory exercises will be supplemented by special lectures upon the problem of testing and classifying feeble-minded and backward children. Competent advanced students may, however, arrange to prosecute special lines of inquiry in place of the work with diagnostic tests.

F. **Elementary Education.** Except Sat. 8. G. S. 142. Superintendent BRUBACHER. Credit, two hours.

The course aims to lay before teachers in active service some of the newer phases of educational practice. It will take up matters of method affecting all the elementary subjects as well as the newer elements in the course of study.

I. The school as a laboratory.

II. Individuality in pupils: rapid; normal; backward, and subnormal children.

III. Health direction: medical inspection; physical education; playgrounds and athletics; sex hygiene; open air or open window rooms.

IV. The course of study—humanizing the subject matter: reading; language; number; geography; history; music; drawing; nature study; spelling; writing; manners and morals.

V. Vocational direction: industrial schools; factory schools; choosing a career.

VI. General method: home study; teaching how to study; home visiting; teachers' meetings; the teacher and supervision; discipline; general reading; professional ethics.

G. **School Administration.** Except Sat. 9. G. S. 142 Superintendent BRUBACHER.

The course is planned for superintendents, principals, and supervisory officers in general, but may be taken by mature teachers who are planning to assume supervisory positions.

I. The superintendent and the teacher: qualifications of teachers; teachers of special subjects; teachers' meetings; helping weak teachers.

II. The superintendent and the pupil: methods of discipline; fraternities and sororities; athletics; vocational direction; sex hygiene; promotions; school records; elimination.

III. The superintendent and the board of education: legislative powers; the budget; source of expert information; selecting teachers.

IV. The superintendent and the community: parent-teachers associations; educational extension; formation of public opinion.

V. The curriculum: the time schedule; selecting textbooks; special activities.

VI. The superintendent's personal policies: the supervision program; personal study; professional ethics; place in the community.

VII. General educational policies: waste in education; theories of efficiency and grading of teachers.

H. **Industrial Education.** Lectures on the Problems of Industrial Education by Professors DEGARMO, KIMBALL, and others. Except Sat., 12. G. S. 142. For full statement of this course see page 16.

I. **Commercial Education.** Business Law. For full description see course E in Economics, page 33.

K. **Commercial Education.** Bookkeeping and Accounting. For full description see under Economics, course F, page 33.

L. **Physical Education for Women.** Daily by appointment, in groups and individually. Sage College Gymnasium. Misses SUTHERLAND and MURRAY.

I. Daily Health Exercises: Breathing Exercises; Corrective Posture Exercises; Rhythmic Movements and Dancing Steps; Aesthetic Arm Movements; Relaxation Exercises.

II. Rhythmic Movements, Folk Dancing, etc.: Rhythmic Exercises and Dancing Steps; Aesthetic Movements; Dancing—Old Country Dances and Songs, Old English Dances, National Jigs, Reels, Court Dances:—Minuet, Gavotte, Pavane.

III. Special Work for and with Children's Classes: Rhythmic Exercises; Simple Dances; Singing Games, etc.

M. **Physical Education—Swimming and Fencing.**

Instruction in swimming and life saving, and fencing for individual training and for teaching, will be given at hours to be arranged for each applicant by appointment.

For this instruction a special charge is made: For swimming, $10; For Fencing, $5, including outfit.

Gymnasium costume, and slippers (without heels) will be advisable for fencing.

For women, Sage College Gymnasium. 10–12 a. m., 3–6 p. m. For men, by appointment. Mr. J. M. GELAS.

N. **Agricultural Education.** Nature Study. School Gardens. Agriculture. See courses on pages 56 to 68.

DEPARTMENT COURSES FOR TEACHERS

In addition to the courses described above there are in the various departments courses arranged specially for teachers. They are described under the announcement of each department. All the work of the Session is arranged primarily to meet the problems of teachers and even in the elementary courses, in foreign languages, for example, selection and presentation of subject matter receive attention and illustration.

INDUSTRIAL EDUCATION

Including Courses in Manual Training, Drawing, and Handicraft

The subject of industrial education is broader than is generally assumed. It means more than the mere teaching of shop work and drawing. It suggests a scheme of education which will make it worth while for all children to remain in school, and which will provide for the children of the masses and for those who enter the great manufacturing and constructive industries something equivalent to what the state is doing for those who enter the professional and managing activities of the country.

We are all aware that many boys and girls do not have opportunity to enter employments that contribute to their development in any sense of the word, either physically, morally, or intellectually, but drift about from one unskilled occupation to another, gaining little or nothing in efficiency.

It is believed that the right sort of handwork and drawing, combined with the proper treatment of book work, will give these children the proper training to prepare them to enter some branch of actual industrial work.

Many manual-training teachers are taking this broader view of their work and its relation to the other school work, and are endeavoring to fit themselves for the field of industrial education. Some of these teachers are weak on the technical side; others fail to grasp the pedagogical phase of the work.

The growth of industrial education is significant. The program of every institute, convention, and association of school men now gives a prominent place to the subject. State laws relating to it have been passed by New York, Massachusetts, Wisconsin, New Jersey, and Connecticut.

Legislative action in reference to industrial and agricultural education is under discussion in nearly every state in the Union. A great national movement along lines of education for efficiency is under way. Manual training, cooking, sewing, drawing, etc., are to become more than subjects within a school curriculum; they will be a part of a new system of education.

For such reasons the University offers in the Summer Session strong courses in education, handwork, and drawing.

Equipment. The shops and drawing rooms of Sibley College are among the largest and best equipped in the country. They are being used regularly by 1200 students and can accommodate 1500. They are at the disposal of the students of the Summer Session, who have the further advantage of seeing the regular instruction given to Sibley College students. They include a machine shop, a foundry, a blacksmith shop, a woodworking shop, and many drawing rooms, lecture rooms, etc. The shops are exceptionally well supplied with machines and tools for complete instruction in the various subjects.

A portion of the equipment has been rearranged and adapted for the special needs of teachers of manual training, drawing, and arts and crafts.

Teachers. The faculty of this department is made up as follows: 1. Teachers of shop work and drawing selected from the regular faculty of Sibley College. Every one of these men is a trained specialist and an experienced teacher. 2. Teachers of handicraft and drawing selected from the teaching corps in cities noted for their excellent handicraft work. 3. Professors in the University who will adapt their usual presentation of subject matter to the needs of teachers in schools of manual training and industrial education. 4. Lecturers on the various subjects concerned, giving complete treatment of the problem of handwork in the public schools. Each of these men is a recognized authority in his special field.

Admission. The courses are open to men and women, and will meet the needs of: (a) teachers and supervisors of industrial arts, handwork, and drawing who wish to perfect themselves in technical skill and professional study; (b) men or women who have teaching experience, or who possess technical ability and wish to qualify as teachers of these subjects; (c) teachers in the State of New York who wish to qualify for the state examination in drawing and manual training as outlined by the State Department of Education; (d) school superintendents, principals of schools, and teachers who wish, through the lectures and conferences, to acquaint themselves with the methods and practices of industrial education.

Daily Program. The shops and drawing rooms are open daily (until noon on Saturday). The lectures for this department are given between the hours of 12 and 1 every day except Saturday. Conferences will be held during the Session on Wednesday and Friday evenings. The University Library is available for reading and original work by students who desire to examine the books, pamphlets, and reports referred to in the lectures and conferences.

Courses of Study. It is believed that some knowledge of the principles of education, a definite understanding of tool processes, and the ability to express ideas adequately through the art of drawing are the professional qualifications which make for efficient teaching of subject matter coming under the head of industrial education. With this aim in view this department offers three definite courses of instruction: 1. Education; 2. Handwork; 3. Drawing.

I. Education

1. Problems of Industrial Education. Lectures and conferences. Except Sat., 12–1, G. S. 142. Professors De Garmo, Kimball, and others.

A discussion of the development of industry and the rise of manufacturing methods, with particular reference to the effect of the same on education. Manufacturing methods have changed so radically and have influenced our educational outlook to such an extent that teachers of all branches of industrial education, and no less all supervising officers, need some knowledge of these matters if they are to attempt to prepare young people for industry. Among the topics treated will be the influence of machinery, in general, upon manufacturing methods, the economic problems of production and the related problems of factory legislation, factory welfare work and industrial education.

In the latter part of the course a few lectures on the practical working out of

some of the problems of industrial education will be given by Messrs. Wood, Edick, and Griffith. These lectures will be illustrated by exhibits of actual school work and by lantern slides.

The General Industrial School. Education for the "Way Out" (Continuation schools). Education for the "Way In" (Pre-vocational schools). The Training of the Vocational Teacher. Four lectures by Arthur D. Dean, Chief of Division of Vocational Schools, New York State Education Department. Mr. Dean will also conduct one or more of the evening conferences.

Evening Conferences. A series of round table conferences held each summer has proved remarkably successful in bringing together in an informal way all persons closely connected with this general field of education. The special problems of each student are taken up and discussed in the light of the combined experiences of all present. These gatherings of students, shop instructors, and lecturers will be continued this year.

The following subjects are proposed for discussion. Vocational training for the age period between 14 and 16. The problem of the technical high school. The meaning of industrial education to the elementary schools. Women in industry—a problem in industrial education. The manufacturer's point of view. The workingman's point of view. The corporation school. Normal schools for training industrial teachers. The coöperative system of education. The philosophy of industrial education in the agricultural community.

II. Handwork

2. **Manual Training for the Lower Grades.** A course in handwork adapted to the first six years of the elementary school. The following processes and materials will be made use of and typical projects in each will be carried out: construction work in paper and cardboard; weaving, reed, and raphia work; basketry; block printing and stenciling; simple bookbinding; blue printing; elementary metal and wood work. This course is offered to meet the particular needs of the regular grade teacher, and to be of help to the special teacher of art and manual training who wishes to become familiar with the problem of handwork in the elementary grades. Except Sat., 2–4. Mr. Wood.

3. **Wood Work for the Elementary Schools.** This is a course employing a comprehensive set of bench tools adapted to the upper grades of the grammar schools. Each model is considered with reference to form, fitness, and decoration. Methods of presentation and execution. This course is intended to equip a capable but inexperienced person for a position as teacher. Daily, 8–11. Mr. Hooper.

4. **Wood Working for Secondary Schools.** A course which aims to prepare for the teaching of wood work in the secondary schools. It includes the study of joinery, furniture making, structural design, and decoration. Concrete problems involving the principles of the work will be suggested by the teacher and carried out by the class. The individual will have considerable latitude in the choice of the particular project and in its design and decoration. Particular attention will be paid to design. Except Sat., 2–5. Mr. Hooper.

5. **Shop Lectures and Conferences.** Lectures and conferences on the organization and supervision of manual training, methods and materials, equipments,

costs, and courses of study; practical talks on subjects of importance to the manual training teacher; woods and wood construction, lumber and forestry, wood finishing, etc. T Th, 4–5. Mr. WOOD.

6. **Foundry Work.** The course begins with instruction in tempering the sand and making green sand moulds for small work. Following this come exercises in core making, and an explanation of loam work. Machine, floor, and sweep mouldings are briefly described. Castings are made in cast iron, and the students are taught to operate the cupola furnace. Mr. VANDERHOEF.

7. **Forging for Secondary Schools.** Systematic instruction in the use of each tool as it is taken up, the study of each material worked, with an explanation of its various grades, the proper method of treatment for each, and the discussion of the methods of making large forgings. The ground covered includes instruction in the building and care of fires, heating, drawing, forming, bending and twisting, upsetting, upsetting while bending, upsetting for square corners, punching, bolt making, welding, including careful instruction in scarfing for the various welds, the making and use of heading tools, chain making, the making and fitting of braces, the construction of hooks and ring bolts, riveting, and the use of threading tools. Training is also given in the use of the power hammer. The work in steel includes drawing, forming, welding, and tempering, and spring and tool making.

This course will not be given unless a sufficient number apply to Professor Kimball on or before July 8th.

8. **Machine Work for Secondary Schools.** The different measuring tools and devices, with the advantages, methods of use, and limits of accuracy of each are considered. Each cutting tool is taken up, its cutting angles and general adjustments are discussed, together with the feeds and cutting speeds suitable for each material worked and for each machine. The course includes instruction in centering, squaring, straight and taper turning and fitting, outside and inside screw cutting, chucking, reaming, finishing and polishing, drilling, tapping, mandrel making, grinding and lapping, boring, brass turning and finishing, ornamental turning, planing flat and V surfaces, fitting, the use of the milling machine, gear cutting, tool making, including taps, drills, reamers, milling cutters, and cylindrical gauges. Mr. WELLS and Mr. HOWE.

III. Drawing and Art Training

9. **Freehand Drawing for Elementary and Secondary Schools.** A course to meet the needs of the public school teacher. A complete course of study, in detail, from the first grade through high school is first considered. Then each subject of that course is carefully developed and worked out. This will include methods of drawing in such phases of the subject as the teacher must meet and in the common mediums such as pencil, water color, crayon, and charcoal. Theory and practice will be closely correlated. The study of design and color, perspective, and the pose, for their public school value, combined with talks on methods of presenting these subjects receive thorough attention. Sketching from nature, including out-of-door work for characteristic growth of trees, forms a part of the course. The relation of art to hand work is considered and the study of design is

made applicable to constructive problems. Except Sat. 9–12, University credit, two hours. Sibley 208. Miss ELY and Miss HOOVER.

Although the above course forms a complete unit in itself, the following course is designed as supplementary.

9a. **Design, Fine and Applied Art.** (Open only to students who have completed course number 9 or its equivalent.) Design is considered from a more advanced point of view and applied to color problems, book plates, title pages, constructive problems, printing, and the like. Stenciling and block printing on velvets and other textiles together with the introduction of interwoven silk on these textiles will be taught; also leather tooling and coloring of leather. Advanced out-of-door sketching will supplement that started in course no. 9. Manuscript printing, done direct with quill or lettering pen together with illumination will be considered as outgrowths of the study of printing. Costume design and household decoration, as far as they are applicable to the grammar or the high school, will be considered in their application. Throughout the course illustrated lectures to develop art appreciation will be given. All subjects will be considered from the standpoint of both the secondary and the more advanced schools. A small laboratory fee (not to exceed one or two dollars) will be charged, to cover cost of material furnished. Except Sat., 8–11. Sibley 202. University credit, two hours. Miss ELY and Miss HOOVER.

10. **Mechanical Drawing for Secondary Schools.** This course is designed for those who wish to teach mechanical drawing in secondary schools and for those who feel the need of a more complete knowledge of this subject to assist them in teaching shop work. Some of the topics covered are use of instruments, lettering, orthographic and isometric projection, inking, tracing, conventions, and working drawings. Students familiar with these topics may elect a more advanced course. Sibley 102. Mr. ————

PSYCHOLOGY

A. **Introduction to Psychology.** G. S. Room C. Credit, two hours. Except Sat., 9. Dr. FOSTER.

This course furnishes a general introduction to the study of the normal human mind from the experimental point of view. It opens with a brief discussion of the nature of a "scientific" psychology, of the problems which such a psychology is called upon to face, and of the methods at its disposal for their solution. It then sets forth in order the facts and laws of mental life which have been revealed by experiment, beginning with the mental elements, sensation, image, and affection; it passes by way of attention, perception, association, and memory to the highly complex processes of imagination, voluntary action, and thought. Throughout the work use will be made of the unique collection of demonstrational apparatus which composes the equipment of a special laboratory in Goldwin Smith Hall; the beginning student is thus enabled to confirm in his own experience the statements made in the textbook and in the lectures.

Readings will be prescribed in Titchener's Primer of Psychology (Macmillan), and questions taken from the same textbook will be answered each week in writing. Supplementary readings in Titchener's Textbook of Psychology will be recommended to those members of the class who desire to pursue more intensive study.

B. **The Psychology of Memory and Learning.** G. S. 137. Credit, one hour. T Th, 11. Dr. FOSTER.

A brief account of the psychology of memory and allied processes, and of their meaning in common life. The course will begin with the necessary preliminary study of attention, image, and idea. The later lectures will deal in greater detail with the results of the experimental investigation of association, retention, and recall, and will discuss the laws of memory, the explanation and systematic bearing of the facts discovered, and the practical bearing of the facts upon such matters as rules for teaching and learning, mnemonic systems, the formation and breaking of habits, recitation, examination, and "cramming." Demonstrations involving the more recent and precise apparatus and technique of the memory-methods will be introduced. Reading will be prescribed in Titchener's Textbook of Psychology, and the student will be occasionally referred to Meumann's Psychology of Learning (trans. by Baird) and Watt's Economy and Training of Memory.

C. **The Psychology of the Abnormal Mind.** G. S. 137. Credit, one hour. M W F, 11. Mr. BORING.

Primarily a lecture course, although opportunity will be given for discussions and for reports upon assigned reading. No knowledge of psychology is presupposed. The lectures will treat of the minds of exceptional and defective persons, including the feeble-minded and geniuses; of mental derangements, such as hallucinations, illusions, hysteria, dreams, hypnotism, and telepathy; and of the disorders of sensation, perception, feeling, and memory, occurring in the insanities. Methods for testing intelligence and mental defect will be considered; and the course will conclude with a discussion of the inheritance of mental traits in relation to eugenics. From time to time demonstrations will be arranged, and it is expected that an opportunity will be provided for a visit to a psychiatrical clinic.

D. **Introductory Laboratory Course.** Psychological Laboratory, Morrill Hall. Credit, two hours. M W F, 2.00–4.30. Dr. FOSTER, Mr. BORING, and Mr. DIMMICK.

The aim of this course is to furnish the student training in psychological methods, and to give him a first-hand acquaintance with the contents of his own mind. The laboratory consists of twenty-seven rooms on the upper floors of Morrill Hall, including dark-rooms, work-shops, and offices. The equipment on the side of apparatus is especially complete, embracing besides the standard pieces for qualitative experiments a great variety of special instruments. The entire equipment of the research laboratory is also available for demonstrations. Experiments will be performed in vision, audition, and the other departments of sense, in feeling, attention, perception, and idea, and toward the end of the work the student will be in a position to carry out experiments upon the more complex processes of association and action. The textbook will be Titchener's Experimental Psychology, vol. i, Qualitative Student's Manual.

E. **Advanced Work in Psychology.** Psychological Laboratory, Morrill Hall. Hours and credit to be arranged. Dr. FOSTER and Mr. BORING.

As a prerequisite for this course, Course D or its equivalent is necessary. The work may consist either of essays and reports upon some special topic, or of laboratory practice at a higher level than that of Course D.

ENGLISH

A. **Composition.** Except Sat., 9. G. S. 162. Credit, two hours. Dr. STELTER.

A practical drill intended for those who lack proficiency in writing: frequent short themes and several longer papers, expository, descriptive, and narrative; discussion of the elements and forms of discourse; weekly personal conferences at hours to be appointed. This course and course B (see below) will together be considered the equivalent of the first term of course 1 in the regular University session.

B. **Introductory Course in Literature.** Except Sat., 8. G. S. 160. Credit, two hours. Mr. KIRK.

A study of four modern novels, and selected lyrics. This course and course A (see above) will together be considered the equivalent of the first term of course 1 in the regular University session.

C. **The History of the English Language.** Except Sat., 11. G. S. 164 Credit, two hours. Assistant Professor MONROE.

A study of the development of the language to the present day, its vocabulary, sounds, inflections, and constructions, foreign influences, and allied topics. Rapid survey of early English Grammar. Special attention is given to the practical bearing which the historical study of the language has upon its present form, written and spoken. Recitations and lectures; collateral reading.

D. **Nineteenth Century Prose.** Except Sat., 10. G. S. 164. Credit, two hours. Mr. KIRK.

A study of representative nineteenth century prose based on careful reading and criticism of Newman and Arnold, with collateral reading of Macaulay, DeQuincey, and others. Practice in composition. Intended for students who have had Course A or its equivalent.

E. **Teachers' Course.** Except Sat., 9. G. S. 156. Credit, two hours. Dr. BAILEY.

Designed for those who are teaching English, or who expect to teach the subject. Methods of treating the novels, the poems, and the essays suggested by the College Entrance Examination Board; discussion of related topics in composition and in grammar.

F. **Modern English Grammar.** M W F, 8. G. S. 164. Credit, one hour. Dr. BAILEY.

A study of the grammatical structure of the modern English sentence, with special reference to the textbooks ordinarily used in the primary and the secondary schools. Discussion of the terminology adopted in recent treatises, consideration of problems in sentence structure, and drill in syntax. Credit gained in this course may not be used to meet the underclass English and history requirement in the University.

G. **Nineteenth Century Poetry.** Except Sat., 10. G. S. 156. Credit, two hours. Professor SAMPSON.

A study of the greater English poets of the past century, with particular reference to their significance today. Reading and discussion of numerous poems of Wordsworth, Byron, Shelley, Tennyson, Browning, Swinburne. Text: Page's British Poets of the Nineteenth Century.

H. **American Literature.** Except Sat., 12. G. S. 156. Credit, two hours. Dr. BAILEY.

Introductory lectures on the colonial and revolutionary periods. Discussion of nineteenth century authors. Text: Page's the Chief American Poets.

J. **Shakespeare.** Except Sat., 8. G. S. 162. Credit, two hours. Dr. STELTER.

Designed for high school teachers of English but open to others who are prepared for somewhat advanced work. Lectures on the life and times of Shakespeare. Close study of some one play (probably Hamlet) and discussion of typical comedies, histories, and tragedies.

K. **Seventeenth and Eighteenth Century Poetry.** Except Sat., 12. G. S. 164. Credit, two hours. Assistant Professor MONROE.

A survey of English poetry from Spenser to Scott. Selected readings in the principal poets, with some study of representative criticisms. Recitations and reports. Each student will make a particular study of some one poet.

L. **Modern Drama.** Except Sat., 11. G. S. 156. Credit, two hours. Professor SAMPSON.

An advanced course designed for those who have completed two or more college courses in English, or whose reading serves as an equivalent for freshman and sophomore work.

Reading and discussion of characteristic plays of some of the more important recent dramatists—Ibsen, Hauptmann, Brieux, Shaw, and others whose dramas have commanded serious attention.

Attention is called to the course of introductory lectures on the Science of Language, page 29.

VOICE TRAINING—ORAL ENGLISH

In all the courses described below, individual instruction will be given by appointment. In this way the particular needs of each student, however varied they may be, can be met. No fees will be charged for this special instruction.

A. **Public Speaking.** Except Sat., 8. G. S. 21. Credit, two hours. Assistant Professor MUCHMORE.

A practical training for speaking in public. Original speeches and selections; extemporaneous speeches. Methods of preparing will be discussed and illustrated. High school teachers will find the methods applicable to their work. Regular students passing this course will be admitted to the work of the second term in Public Speaking, course 1.

B. **Voice Training.** Except Sat., 9. G. S. 21. Credit, one or two hours as arranged at the beginning of the course. Dr. BLANTON.

This course consists of exercises, both physical and mental, for the development of pure tone, flexibility, melody and strength of voice, clear enunciation, and for relief from high, strained tones, harshness, throatiness, and speakers' sore-throat. Private appointments will be given each student, in which the throat will be examined, the voice tested, and, if needed, special exercises prescribed. The course necessarily includes training for poise and ease of action. The relation of the voice in conversation, teaching, and public speaking to health is emphasized.

D. **Oral Reading.** Except Sat., 10. G. S. 21. Credit, two hours. Assistant Professor MUCHMORE.

This course is designed especially to help teachers of literature, but is open to all students. The first part of the course will be devoted to the elements of reading; attention, individualization, and sequence of ideas. The second part will be given to the oral interpretation of great pieces of literature, with special emphasis on the spirit rather than the form. Each member of the class will receive private appointments, and will prepare individually at least one selection.

E. **Speech Defects.** M W F, 11. Credit, one or two hours as arranged at the beginning of the course. G. S. 21. Dr. BLANTON.

This course is being organized to meet the growing demands of two classes of persons: those who lisp, stammer, stutter, or have cognate speech defects, and teachers of oral English, elocution, and public speaking who wish to prepare themselves to correct such troubles. It is only in a sympathetic atmosphere such as will prevail in a class thus organized, that the full difficulties can be met and permanently overcome. Care will be taken that the students with speech defects thus working in concert with other members of the class shall in no way be exploited for the benefit of those learning to teach. Speech defects can only be corrected by the exposition of the underlying causes. Pathological conditions will be thoroughly studied and remedies and exercises, mental and physical, will be prescribed at private appointments given each member of the class.

FRENCH

A. **First Year French.** Grammar, reading, composition, and conversation. Colin and Sérafon's Practical Lessons in French Grammar. Except Sat., 8 and 12. G. S. 283. Professor OLMSTED. University credit, four hours. Entrance credit, one unit.

The object of this course is twofold: first, to give to beginners a thorough drill in the essentials of French pronunciation, grammar, and reading; second, to offer to teachers an opportunity to study methods of presentation of these subjects to beginners. Particular attention will be given to the subject of French pronunciation, and the conversational method of instruction will be employed as largely as possible. The entire subject of elementary French grammar will be completed, and the reading of easy texts will be begun. By supplementary reading after the Summer Session the beginner can prepare himself for the fall examination in Second Year French, or he may complete the work for the second unit by taking in the University a special course three hours a week throughout the fall term.

Teachers who follow this course are recommended to take course D in connection with it.

B. **Second Year French.** Grammar review and reading. Snow's Fundamentals of French Grammar; Francois' Introductory French Prose Composition; Hugo's Gavroche (Clarendon Press); Labiche's Voyage de M. Perrichon; About's La Mère de la Marquise; Dumas, père, Pages Choisies. Except Sat., 8 and 12. G. S. 281. Professor GIROUD. Credit, four hours. Entrance credit, one unit.

C. **Third Year French.** Picard's la Petite Ville (Ginn); Balzac's Gobseck (Oxford Press); Loti's les Pêcheurs d' Islande (Ginn); Daudet, Choix de Contes (Heath); Francois' Advanced Prose Composition (Am. Book Co.). Daily, 8 and 12. G. S. 290. Assistant Professor MASON. Credit, five hours. Entrance credit, one unit.

This course is intended for those who have had two units of preparatory school French, or one year of college French. Students taking this course are expected to devote their entire time to the subject.

D. **Teachers' Training Course.** Lectures, discussions, and sight reading. M W, 9. G. S. 283. Professor OLMSTED. Credit, one hour.

Particular attention will be given to French pronunciation, to the value of phonetic transcription, and to other devices for the teaching of French pronunciation.

E. **Explication de Textes.** Crane, le Romantisme français (Putnam). T F, 9. G. S. 283. Assistant Professor MASON. Credit, one hour.

A course for teachers and advanced students. Passages from representative works of French Romanticism will be carefully studied and criticized. Lectures, reports, and explications de textes. The course will be conducted mainly in French.

F. **Lectures in French.** Trois époques intéressantes dans l'histoire du Théâtre en France. Except, Sat. 11. G.S. 281. Credit two hours. Professor GIROUD.

The course includes: La Comédie au XVIIIme siècle, (ten lectures). Le théâtre pendant la Révolution et sous le premier Empire, (ten lectures). Le théâtre romantique, (nine or ten lectures).

Attention is called to the course of introductory lectures on the Science of Language, page 29.

SPANISH

A. **First Year Spanish.** Spanish for beginners. Grammar, translation, reading, composition, and conversation. Olmsted and Gordon's Spanish Grammar. Elementary readers and texts. Daily, 8 and 12, and three additional hours a week to be arranged. G. S. 290. Mr. DALE. Credit, six hours. Entrance credit, two units.

The object of this course is to afford to those who have had no Spanish an opportunity to acquire the essentials of the grammar, to learn to translate easy Spanish readily, to read Spanish as Spanish intelligently, to understand spoken Spanish, and to acquire sufficient vocabulary to be able to converse on topics of daily life. Spanish will be spoken, as far as feasible, in the class room.

There will be twelve prepared recitations a week; the three additional hours will be devoted to conversation, dictation, and written grammatical exercises.

After successfully completing this course, the students will be far enough advanced to be able to pursue the second year Spanish course in the University.

B. **Second Year Spanish.** Designed to follow Spanish A. This course will consist of readings and translation from representative Spanish writers, with informal talks, mainly in Spanish, on topics of related interest, such as Spanish history, literature and art. Except Sat. 9. G. S. 134. Credit, two hours. Dr. VAUGHAN.

Textbooks: Pérez Galdós, Marianela; Valdés, José; Ibáñez, La Barraca. If desirable Cervantes, Don Quijote or Calderón, El Mágico Prodigioso may be substituted for either of the last mentioned texts.

C. **Training Course for Teachers.** Except Sat., 10. G. S. 137. Credit, two hours. Dr. VAUGHAN.

This course is designed for those intending to teach Spanish in secondary

schools. The work consists of a careful study of Spanish pronunciation and idioms, both in Spain and Latin America, a review of the grammatical difficulties and the best methods of presenting them to the student, based upon the grammars in most common use, and daily exercises in Spanish composition. Other topics treated will be :(1) the proper selection of reading matter for the different years of the course; (2) the place of translation in connection with reading; (3) reading without translation; (4) the historical and geographical background; (5) formal prose composition and free composition; (6) grammar in its relation to language; (7) the importance of commercial Spanish; (8) the use of Spanish magazines as adjuncts to class room work and in the library; (9) the advisability of Spanish "clubs" and the results that may be obtained by them; (10) the question of books, phonographs, and other means of self-improvement for the teacher.

Required textbooks are, Olmsted and Gordon, Spanish Grammar; and Crawford, Spanish Composition.

Students of Courses B and C are invited to meet once a week with the instructor for an evening of Spanish games and conversation preceded by an informal lecture in Spanish.

GERMAN

Courses A, B, C afford the earnest worker an opportunity to gain a working knowledge of German by highly concentrated effort, and a chance to make a rapid review of previous reading.

The other courses are intended for teachers and for students of considerable proficiency in the subject. They present opportunity for advanced study in language, grammar, and literature, and also are intended to give direct practical assistance in all the various problems which confront the teacher. Students are urged and encouraged in every possible way to use German in and out of the class room. See particularly under course J, page 28.

A. **First Year German.** Oral training, grammar, composition, reading. Daily except Sat., 8 and 12. G. S. 183. Dr. ZINNECKER. University credit, four hours. Entrance credit, one unit.

This course affords an opportunity for those who have had no German to acquire a practical working vocabulary, to master the essentials of grammar, to learn to read easy German, and to begin conversational work in the language. As far as possible the language of the class room will be German. Two recitations will be held daily except Saturday with sufficient time between the two for the preparation of the second lesson. After successfully completing this course, students can, by supplementary reading during the summer, prepare themselves for the fall entrance examination in second year German, or they may take the second year German course during the first term of the regular college year. Dr. ZINNECKER will be in Room 178, T, Th, 9 to give special assistance to members of this class.

This course also affords teachers of German an opportunity for observation of methods of teaching.

B. **Second Year German.** Rapid review of the essentials of grammar and more extensive work in translation, composition, and conversation. Two recitations will be held daily except Saturday with sufficient time between the two for the preparation of the second lesson. Textbooks: Storm's Immensee (ed. by Elmer & Neumarker, Chas. Merrill Co.), and Mezger und Mueller, Kreuz und

Quer durch deutsche Lande (American Book Company). Vos's Essentials of German. Prerequisite: one year of high school German or its equivalent. Those who do not present certificates showing the completion of one year's work in German will be required to take a test at the beginning of the course. This course is equivalent to the second year of high school German and its completion entitles the student to a second unit of entrance credit in German. University credit, four hours. Daily except Sat., 8 and 12. G. S. 177. Dr. MONTESER. The instructor will be in room 178, T Th, 10, to afford special assistance to members of this course.

C. **Third Year German.** Reading and translation of German texts accompanied by exercises in grammar, composition, and conversation. Two recitations a day will be held, with a sufficient interval to enable the student to prepare for the second recitation. Text-books: Joynes-Wesselhoeft's German Lesson Grammar, Wildenbruch's Der Letzte, Storm's In St. Jürgen, Freytag's Die Journalisten. Prerequisite: two years of high school German or its equivalent. The completion of this course entitles the student to the third unit of entrance credit in German. Daily, 8 and 12. G. S. 134. Mr. HOLT. University credit, five hours.

The instructor may be consulted T Th, 9 in room 178.

[**Advanced Course in Modern German Grammar.** Assistant Professor BOESCHE. Credit, two hours.

The aim of this course is entirely practical. It is particularly intended to serve the needs of teachers of German who feel that without a thorough and fairly scientific knowledge of grammar there can be no competent teaching of its elements. The most troublesome and important questions in modern German accidence and syntax will be discussed with far greater thoroughness than is found in even the larger works on the subject. The inflection of pronouns and adjectives, the use of the cases, the employment of haben and sein as auxiliaries, the subjunctive, moods and tenses in indirect discourse, and the order of words will be among the topics treated. The outside work will include exercises especially designed for this course, assigned readings in works of reference, and the preparation of oral and written reports.]

Not given in 1914.

D. **Middle High German.** Except Sat., 11. G. S. 137. Assistant Professor BOESCHE. Credit, two hours. This course is intended to serve two purposes: to enable the student to read medieval German literature in its original form, and to give him the historical point of view in dealing with modern German grammar. Portions of the *Nibelungenlied*, of Wolfram von Eschenbach's *Parzival*, a considerable number of the poems of the minnesingers, especially Walter von der Vogelweide, and specimens of Middle High German prose will be read and studied. The grammatical treatment will constantly have in mind the explanation of modern German and will thus particularly serve the practical needs of teachers.

E. **Advanced Composition and Conversation.** Except Sat., 8. G. S. 190. Assistant Professor DAVIDSEN. Credit, two hours. This course will aim to train the students to write and to speak correct German. It will be conducted as far as possible in German. Papers, based upon pictures and works of literature discussed orally in class, will be handed in regularly and corrected by the teacher.

Certain hours will be set aside for instruction in elementary phonetics, if the class so desires.

[**Studies in the Style and Technique of the Nineteenth Century Prose Writers.** Except Sat., 10. G. S. 190. Assistant Professor DAVIDSEN. Credit, two hours; with one hour more for extra work assigned.]

Not given in 1914.

F. **Comparative Studies in the German Drama.** Exc. Sat., 9. G. S. 183. Assistant Professor DAVIDSEN. Credit, two hours, with one hour more for extra work assigned.

Starting with the dramas of Friedrich Hebbel, a study will be made of the following topics: *Das bürgerliche Drama; Schicksalsdrama und Charakterdrama; Nibelungendramen.*

The exercises will for the most part be conducted in German. Among the dramas studied with reference to Hebbel's dramas, will be: *Lessings Miss Sara Sampson* and *Emilia Galotti; Schillers Kabale und Liebe* and *Dei Braut von Messina; Sophokles König Odipus; Wagners "Ring"; Ibsens "Nordische Heerfahrt."*

G. **Life and Works of Goethe.** Except Sat., 10. G. S. 137. Assistant Professor BOESCHE. Credit, two hours. A comprehensive presentation of Goethe's life, work, and personality, and of the influences stimulating his development. Lectures, in German only, will alternate with discussions in which each student, while not absolutely required to use German, will be constantly encouraged to do so. The subject matter of each lecture will be announced one or two days beforehand, with references to leading biographies accessible in the library reading room. This arrangement will aid those without sufficient previous practice in listening to lectures in German. The discussions will be largely devoted to the required reading. This will comprise a considerable number of the poet's works. The assignment will vary according to the individual student, but the ability to read German rather fluently must be taken for granted. There will be no translation into English.

Erich Schmidt's six volume edition of Goethe's works will be used (Insel-Verlag, Berlin 1909; price complete, 6 marks, $1.50). The books may be obtained in Ithaca. Bielschowsky's biography of Goethe is recommended, but will not be a required textbook (Goethe und sein Leben, two volumes, Munich, C. H. Beck. Price 14 marks, $3.50. English translation: The Life of Goethe, three volumes, New York and London, G. P. Putnam's Sons, 1905. Price $10).

H. **Training Course for Teachers.** Except Sat., 9. G. S. 190. Dr. MONTESER. Credit, two hours, with an extra hour for work assigned.

The aim of this course is to aid the teacher of modern foreign languages in the practical solution of class room problems by a study and demonstration of methods used by progressive teachers in Europe and in this country.

Among the topics to be treated are the following: a brief history of the teaching of German in the United States; the Report of the Committee of Twelve; the reform movement in the teaching of foreign languages in Germany and other European countries; the educational value of German; the aim of the teaching of German in a two years, three years, and four years course in the high school; the question of introducing German into our elementary schools; the bearing of certain results of modern psychology on the instruction in modern languages; the place of phonetics; standard pronunciation; the inductive method of teaching

grammar; the treatment of special topics in grammar and syntax; drill and habit-formation; "living" grammar; the Gouin method; use of connected texts and of detached sentences in elementary language work; the relation of oral work to written exercises; the building up of a vocabulary; the amount and proper selection of reading matter for the different years of the course; the place of translation in connection with reading; reading without translation; dramatization of stories; the treatment of poems; the historical and geographical background of the reading matter, leading to a sympathetic understanding of the life of the German people; the use of pictures and other illustrative materials; formal prose composition and free composition; the use of German journals and magazines; helpful adjuncts to class room work, such as the use of a pupils' library, a German "Verein," and international pupils' correspondence; the preparation of the teacher and aids to self-improvement.

The New York State Syllabus of 1910, the requirements of the College Entrance Examination Board, and the present syllabi for the teaching of modern foreign languages in the elementary and high schools of the city of New York will also be studied.

In order to help the teacher in the selection of textbooks to be used with beginners, an exhibit of the most recent grammars and elementary readers will be made, and a number of these will be critically studied by the students.

J. **Six Lectures in German** on popular subjects, and open to the general public will be given on Wednesday evenings by Dr. BOESCHE, Dr. DAVIDSEN and Dr. MONTESER in a room to be announced later.

In order to give greater opportunity for hearing and speaking German, a German table has been maintained for the past two summers. This has been so successful and so helpful, that it is proposed in 1914 to extend the facilities by renting a house for the exclusive occupancy of students in German. The residence of Professor W. T. Hewett has been secured. It is five minutes walk from Prudence Risley Hall and in one of the most beautiful parts of the town. Miss Elizabeth Undritz will have charge of the house, and of the table.

As the number who can be accommodated will be limited, prospective students are asked to make their reservations at once by writing Professor H. Davidsen.

Attention is called to the course of introductory lectures on the Science of Language, page 29.

LATIN

A. **Latin in the High School.** Beginner's Latin, Latin Grammar, Composition, Cæsar, Cicero, Virgil. This course will be devoted specifically to the content of the Latin curriculum in the high school and to the aims and methods of secondary Latin instruction. The following topics will be discussed in detail. What shall the beginning student surely learn during the first year of Latin study? What principles of Latin syntax are essential for the high school student and how may these principles best be presented? The teaching of Latin composition, its purposes, and its methods (practice in oral composition and in Latin conversation will be given in course B). The accurate and adequate interpretation of Cæsar's

Gallic War, Cicero's Orations, and Virgil's Aeneid, based on selected portions of these works. Daily exc. S, 8 o'clock, Gold. Sm. 128. Professor DURHAM.

B. **The Equipment of the Teacher of Latin in the High School.** The object of this course is to give to secondary teachers of Latin a broader foundation for their work by opening up to them several of the most important of the allied fields in classical teaching. Epigraphy and the bearing of Latin inscriptions on public and private life, on government, on provincial management, on financial administration, and on religion, christian and pagan. The informal or colloquial Latin of the Romans, how it differed from the classical or formal idiom, its extension to the provinces, and the development of the Romance languages. Paleography and the transmission of manuscripts. The preparation of a modern edition of a Latin author. Greek influences on the Latin language and literature. Catullus and his school,—interpretation of his poems, with suggestions of plan and scope of private work for the teacher during the academic year. Latin conversation in the high school. Throughout the Summer Session, daily drill will be given in Latin conversation, in pronunciation, and in the accurate reading of Latin prose and of the dactylic hexameter. Daily exc. S., 9 o'clock, G. S. 128. Professor DURHAM.

C. **Graduate Work.** Qualified students may begin or may continue their work in candidacy for the degree of Master of Arts. Correspondence in advance is invited, and prospective graduate students should confer with ProfessorDurham immediately after their arrival in Ithaca.

Particular attention is called to the course of introductory lectures on the Science of Language. All students in course B should arrange their work so that they can attend these lectures.

INTRODUCTORY LECTURES ON THE SCIENCE OF LANGUAGE

A course of nineteen lectures given by professors in the Departments of Greek, Latin, German, French, and English. All teachers of foreign languages and of English are urged to arrange their schedules of work so that they may attend these lectures. Credit, one hour. All of the lectures will be given at 12 o'clock noon in Goldwin Smith, room 128.

1 Introductory Lecture. Wednesday, July 8. Professor BRISTOL.

2–4. The Indo-European Family of Languages, their grouping and general status of relationship; a brief sketch of grammatical and linguistic study from classical times down to the present. Thursday, July 9; Friday, July 10; Monday, July 13. Professor DURHAM.

5. The Physiology of the Organs of Speech. Tuesday, July 14. Dr. BLANTON.

6–10. The Principles of Phonetics, with especial reference to English, German, and French. Wed. July 15 through Tues. July 21. Professor DAVIDSEN.

11. Analogy. Wednesday, July 22. Professor DURHAM.

12. Semantics. Thursday, July 23. Professor DAVIDSEN.

13. Phonetic Laws. Friday, July 24. Professor DURHAM.

14–15. The Germanic Group of the Indo-European Family. Monday, July 27 and Tuesday, July 28. Professor BOESCHE.

16–17. A Brief History of the English Language. Wednesday, July 29 and Thursday, July 30. Professor MONROE.

18–19. A Brief Sketch of the French Language. Friday, July 31 and Monday, August 3. Professor MASON.

HISTORY AND GOVERNMENT

A. **American Constitution and Government.** Except Sat., 8. G. S. 234. Credit, two hours. Professor BRETZ.

A survey of American constitutional development with reference to the more important questions of politics and government at the present time. Among the topics treated are: judicial control and the proposed recall of judicial decisions; amendments to the Federal Constitution, with special reference to the interpretation of the Fourteenth and Fifteenth Amendments; and constitutional questions arising from the acquisition of territory in the Spanish-American War. Attention will be paid to other problems of current politics.

B. **Political Parties and Party Problems in America.** Except Sat. 11. G. S. 234. Credit, two hours. Professor WOODBURN.

The first part of the course will present a brief historical sketch of political parties in the United States from 1789 to the present time, including a consideration of the old Congressional Caucus and the rise of the Convention system; the chief issues, leadership, and constituencies presented by successive political parties, and their most notable contests for the presidency, and the influence of party life and organization on national development. The latter half of the course will consider the recent changes in party life and organization, together with certain current problems of party government, such as presidential and local primaries, the Australian and the short ballot, the spoils system, the problems of the national convention and party representation, methods of campaigning and party financing, the influence of the corporation in politics, the integrity of the ballot and the question of a wide suffrage, the popular election of United States Senators, the initiative and the referendum, and the conflict between political independence and party allegiance. Effort will be made to study the actual forces in government as illustrated in party usage, in the practical operation of party machinery, and in certain unwritten aspects of the American constitution.

C. **American Political History.** From the close of the American Revolution to the Era of Jackson, 1781–1829. Except Sat., 12. G. S. 234. Credit, two hours. Professor WOODBURN.

The course will consider the defects and failure of the Old Confederation; the making of the Constitution, the organization of the new government, Hamilton's financial measures, foreign relations under Washington and Adams, early political parties, Jeffersonian democracy and territorial expansion, the causes and results of the war of 1812, the occasion and original scope of the Monroe doctrine, and the problems of domestic politics immediately preceding the first election of Jackson. Emphasis will be placed upon American industrial development and the influences tending to promote the growth of American nationality.

D. **American Social History.** The expansion of the United States across the Alleghany Mountains, 1750–1848. Except Sat., 10. G. S. 234. Credit, two hours. Professor BRETZ.

This course deals with the exploration of the trans-Alleghany country, the movement of population into the West, Indian wars and relations with foreign powers on the frontier, territorial acquisitions, land policy, industrial development of typical communities, and in general with the social life of the new communities between the Alleghanies and the Mississippi. The plan is to supplement in some

detail the customary treatment of American History and to emphasize the characteristic features of westward expansion.

[**American History. The Period of Civil War and Reconstruction, 1850–1875.** Professor BRETZ. Not given in 1914.

A general course covering the more important issues in the period indicated. The best historical literature for the period will be pointed out and the results of the more recent study of the field will be indicated. The work of the course will consist chiefly of lectures with assigned reading.]

[**English History to 1485.** Professor LUNT.

Not given in 1914.

A survey of the salient aspects of political, constitutional, economic, and social development. The lectures deal with the land and the people; the development of a Teutonic civilization; the changes wrought in the social and legal framework by the imposition of feudalism; the foundation of the English constitution; the gradual rise of representative institutions; the relations with the continent; the introduction and spread of Christianity; the growing power of the Church and the conflict between church and state; life in town and country; the growth of commerce and industry and the rise of the middle class; intellectual currents and the birth of modern England.]

E. **English History. 1485–1914.** Except Sat., 10. G. S. 242. Credit, two hours. Professor LUNT.

A survey of the salient aspects of political, constitutional, economic, and social development. The lectures deal with the part played by England in the international rivalries of the sixteenth century; the reformation; the economic and social changes under the Tudors; the struggle between crown and parliament under the Stuarts; the foundation and expansion of the empire; the growth of cabinet government; the economic revolution; parliamentary reform; parties and politics; and other similar topics.

F. **Medieval History.** Except Sat., 9. G. S. 242. Credit, two hours. Professor LUNT.

A survey of the history of Europe from the barbarian invasions to about 1300 A. D. Such topics will be considered as the later Roman Empire; the early Germans; the migrations; Christianity and the Church; the rise of Mohammedanism; the Frankish kingdom; the empire of Charlemagne; the empire and the papacy; the crusades; feudalism; life in town and country; intellectual development.

G. **The Roman Empire from Augustus to Constantine.** Except Sat. 11, G. S. 242. Credit, two hours. Professor SILL.

A survey of the history of the Mediterranean world under Roman imperial administration, with particular reference to the conservation and expansion of Greco-Roman culture and to the symptoms and the causes of its decadence. Special attention will be given to the administration of Augustus, to social conditions in the second century, to the conflict of religions, and to the reorganization of the empire under Diocletian and Constantine.

H. **Topics in Ancient History.** Except Sat. 9. G. S. 236. Credit, two hours. Professor SILL.

A course for teachers of history, designed to be of practical assistance to them in their work. The topics treated in the class will be selected from the field of

ancient history. They will be discussed with a view to defining and illustrating the motives of historical study, the relations of history to other studies, the characteristics of historical evidence, the methods of historical criticism, and the principles to be applied in selecting and preparing material for use in the classroom.

ECONOMICS AND BUSINESS

The following courses are designed to meet the needs of three classes of students in the Summer Session: (1) those desiring regular college credit for general economics; (2) students with special interests in economic and social subjects; (3) students seeking broad preparation for the teaching of commercial subjects in secondary schools. For the first group, Courses A and B together cover the subject matter usually included under elementary economics; for Cornell students, Courses A, B, and C substitute directly for the six hours of Economics 51 of the regular year, or Courses A and C for the first term, and A and B for the second.

Unless college credit is desired, any course may be taken separately or in such combination as suits the student. Courses E and F have been specially provided for teachers of commercial subjects, but such students are urged, for the sake of broad and fundamental training, not to neglect the principles of economics and finance as presented in Courses A and C, or the important social and industrial matters discussed in B and D. Further, these courses may well be combined with work in industrial education, the principles of education, educational psychology, or history and government.

A. Principles of Economics. Except Sat., 9. G. S. 264. Credit, two hours. Assistant Professor TURNER.

This course is concerned with the foundations of economics. It centers around value, money, prices, credit, banking, and exchange. While the course will be theoretical, various important practical and social aspects will be constantly emphasized. Among these will be a discussion of the increasing cost of living, the causes, evils, and some of the proposed remedies, and a consideration of our national banking system, its chief defects, and the reforms to be effected through the recent federal legislation.

B. Economic Problems. Except Sat., 10. G. S. 264. Credit, two hours. Assistant Professor BLAKEY.

This course will give a general survey of the following topics, special attention being given to current legislation. Labor problems: trade unions, co-operation, social insurance, labor legislation. The tariff: free trade, protection, subsidies, bounties. Taxation: customs, income, inheritance, corporation, general property and other taxes, and questions of tax reform. Railways: economic characteristics, rate making, discriminatory practices, regulation, government ownership. Trusts and monopolies: modern industrial development, monopoly vs. competition, large vs. small-scale operations, problems of regulation and control. Socialism: what it is, the case against capitalism, the program of socialism, the outlook.

C. Corporation Finance and the Trust Problem. Except Sat., 8. G. S. 264. Credit, two hours. Assistant Professor TURNER.

A comprehensive study of the modern business corporation. The following topics will receive special consideration. The nature of a corporation, together with its advantages and disadvantages, compared with the partnership and joint stock company; problems of finance and promotion; stocks and bonds, what they are, the basis of their issue and the principles of their valuation; questions of capitalization; financial reports, the balance sheet and income statement; reorganization and receiverships; the problem of regulation from the legal and financial standpoint.

[**Money and Banking.** Credit, two hours. Open only to students who have had or are taking course A or its equivalent. Not given in 1914.

This course will consider the general principles of money and banking, their exemplification in American history, and their application to certain problems at present agitating the public mind, such as the increased cost of living, and the reform of our national banking system.]

D. **American Social Problems.** Except Sat., 11. G. S. 264. Credit, two hours. Assistant Professor BLAKEY.

This course will give a general survey of the following questions with particular reference to present American conditions: the family, divorce, child welfare, women in industry, the theory of population, degeneracy, eugenics, race suicide, the liquor problem, poverty, charities and corrections, immigration, growth of cities, tenements, slums, social settlements, recreation, social surveys, rural social problems, changing conceptions of the work of school, church, state, and other social institutions.

E. **Business Law and Procedure.** Except Sat., 11. G. S. 269. Mr. RAYNOR.

Contracts, their essentials and form. Particular contracts: sales of goods, bailment of goods, insurance, negotiable instruments, agency, transfers of real estate. The course will cover the subject as given in standard textbooks. The aim is to afford the practical knowledge of law that every business and professional man should possess, and to show the methods of teaching the subject in commercial high schools.

F. **Bookkeeping and Elements of Accounting.** Except Sat., 10. G. S. 269. Mr. RAYNOR.

The "account method" of presentation will be followed. The fundamental principles of modern bookkeeping, both double and single entry, the adapting of these principles to special column books, card systems, balance ledgers, etc., and the making of statements and balance sheets, will be shown and discussed. Attention will be paid throughout to the aims and methods of teaching the subject in high school.

MUSIC

A special announcement of the Department of Music may be had on application to the Secretary of the University.

Most of the courses offered consist of five exercises a week, one each week day except Saturday. The number of actual hours of class work in any course may be found by multiplying the weekly exercises by six.

The word "hour" used of University credit, means the equivalent of one class exercise a week for a half year. One hundred and twenty such hours constitute the "hours" requirement for the degree of Bachelor of Arts.

COURSES FOR SUPERVISORS OF MUSIC

These courses are primarily intended for the training of supervisors and special teachers of music in the public schools. The time required for the completion of the work depends on the ability and capacity of the student and upon the amount and quality of training which the student has had previous to entrance.

Students who are proficient in sight reading, ear training, piano playing, and singing, and who pass the examinations for the preparatory and first-year courses, may complete the work in two Summer Sessions. Others will find it necessary to attend three or four Summer Sessions, with a considerable amount of study at home during the academic years between Sessions. Full and detailed information in regard to this home study may be had on application to Professor Hollis Dann.

Entrance examinations are given to each new student; credit for previous work done at other institutions or under private teachers is based upon the results of these examinations.

The limit in numbers was practically reached at the 1913 session. To avoid overcrowding of classes, the Department of Music reserves the right to reject applications for admission made after the opening of the Session on July 6, 1914. Because of the large number of regular music students in attendance, it has been found necessary to give them the preference in admission, over students of other departments.

FIFTH YEAR COURSES

An increasing number of teachers who have completed the course for Supervisors, return each year for advanced study. Several advanced courses, open only to teachers who have completed the course for Supervisors of Music at Cornell University, are now offered. Subject to certain conditions relating to regular attendance, all A, B, C, and D classes are open to these students.

PHYSICAL EDUCATION

Recognizing the demand for physical training in the public schools, and realizing the intimate relation which this subject, properly taught, bears to music in the schools, the department has included physical training in the course for Supervisors. Two expert teachers have been engaged for this work, coming from London, England, especially for this Session. Much of vital importance to the students is expected from this new department. Sage Gymnasium. Daily by appointment.

General Scheme of the Course in Physical Education

I. Daily Health Exercises
   - Breathing Exercises
   - Corrective Posture Exercises
   - Rhythmic Movements and Dancing Steps
   - Aesthetic Arm Movements
   - Relaxation Exercises

II. Special Classes for Rhythmic Movements, Folk Dancing, etc.
   - Rhythmic Exercises and Dancing Steps
   - Aesthetic Movements

Dancing—
Old English Country Dances and Songs
Old English Dances
National Jigs, Reels, etc.
Court Dances—Minuet, Gavotte, Pavane, etc.

III. Children's Classes
Rhythmic Exercises
Single Dances
Singing Games, etc.

Each woman student is advised to provide herself with a light costume including dark blue or black serge bloomers and white middy-blouse. Suitable shoes may be purchased in Ithaca at the direction of the instructor.

Preparatory-year courses are designated A. First-year courses are designated B. Second-year courses are designated C. Third-year courses are designated D. Fifth year courses are designated E.

Sight Reading—A. This is an elementary course. For entrance, the student must possess sufficient aptitude and ability to pursue the subject with profit. The requirements for completion include the ability to read with facility, at sight, simple music such as is taught in the first three grades of the public schools, using the Latin syllables.

Daily except Saturday, 9.50, (two sections), Miss WHITE, Miss STARK.

Sight Reading—B. This course requires reading at sight, music taught in the first six grades of the public schools, with and without the Latin syllables.

Daily except Wednesday and Saturday, 2.15, (two sections), Mr. SCALES, Professor HOERRNER.

Material and Sight Reading—C. The student is required to read at sight, without accompaniment, the music used in the upper grades of the public schools including music used in the high school, reading words and music simultaneously. Definite knowledge concerning the suitability and use of material for the grammar grades is also required. A written examination, relating to material, is required for the completion of this course, supplementing the oral sight reading test.

University credit, one hour.

Daily except Saturday, 8.55, (two sections), Mr. SCALES, Professor HOERRNER.

Proficiency in sight singing is of great advantage to the student entering the course for Supervisor's. New students are strongly advised to acquire the ability to sing simple music with the syllable names.

Dictation—A. (Study of tone and rhythm.) The subject matter of music is presented first to the sense of hearing. In this course the student gains the power to think tones and to sense rhythms, acquires a practical knowledge of the scale and of the Latin syllables used in sight reading, and gains the ability to recognize and write simple phrases.

Daily except Saturday, 8.55, (two sections), Miss WHITE, Miss STARK.

Dictation—B. This course deals with the problems of tone and rhythm included in the first five years in the public schools.

The topics for consideration are: oral and written tonal dictation, and oral

and written metric dictation. Through the daily oral and written lessons the student gains the power to hear what he sees and to write what he hears.

University credit, two hours.

Daily except Saturday, 8.55, Mr. BUTTERFIELD.

Dictation—C. This course includes the sixth, seventh, and eighth grades of tone and rhythm study in the public schools. The student is required to recognize and write in both major and minor keys any melody of moderate difficulty. Additional training, including the recognition and writing of music in two, three, and four parts, is also required as a part of the necessary equipment of the supervisor.

University credit, two hours.

Daily except Saturday, 8.00, Mr. BUTTERFIELD.

These courses in musical dictation together with the courses in sight singing and melody, give to the student a mastery of the elementary subject matter of music and constitute the foundational training essential for advanced study.

The superiority of the best European schools of music over most American schools is partly due to the thorough three-year course in sight singing and dictation which is required of every student. The results are everywhere apparent. The student of harmony and counterpoint hears and visualizes the chord and the melody before he writes them; the orchestral player hears the tones and feels the rhythm of a difficult passage before he plays it; the singer likewise possesses the musicianship which comes with the ability to read and write the language.

The power to hear what is seen and to write what is heard, is absolutely essential to real success, for both teacher and pupil.

The ability to read and write with facility is a prerequisite to advanced study, in music, as in other languages.

The proper place for this foundational training is in the public elementary and secondary schools; the medium for its attainment is the supervisor of music.

Students planning to enter these courses are advised to acquire some degree of proficiency in recognizing and writing simple melodies. Directions concerning home study will be given on application to the Principal of the Department of Music.

Material and Methods—B. This course is devoted to the study of material and methods for the kindergarten and for the first four years in music. Beginning with the rote songs of the kindergarten and first grade, the method of presentation will be demonstrated in detail.

This course is given by an experienced supervisor. The methods employed are those used in the school room. The course, therefore, is a demonstration of the material and methods used in teaching music in the public schools from the kindergarten to the fifth year.

University credit, one hour.

Daily except Friday and Saturday, 10.45, Miss BRYANT.

Methods—C. This course is devoted to the pedagogical consideration of music from the kindergarten to the fifth year inclusive. The work of each year is taken up in detail and all problems which confront the grade teacher and supervisor are thoroughly discussed. Plans and methods for class-room work and general supervision are carefully presented.

On Friday of each week the lesson will consist of a demonstration of the year's work under consideration, with a class of children from the Ithaca public schools. Students in this course will thus have the opportunity of observing the practical application of methods with classes of children, from the kindergarten to the fifth year inclusive.

University credit, two hours.

Daily except Saturday, 9.50, Professor DANN.

Methods—D. This course is open only to students who have completed Methods C, and is concerned with the pedagogical consideration of music in the grammar grades. The course will deal with the details of teaching and of supervision in the upper grades, and with the means for cultivating the musical taste and ideals of the school and community.

Instruction is given in this course for the proper training and direction of the grade teacher. All the problems which confront the supervisor are thoroughly considered, and a systematic plan is laid out for his guidance.

Practical application of the instruction given will be made in the form of practice teaching by members of the class with classes of children.

University credit, two hours.

Daily except Wednesday and Saturday, 2.15, Professor DANN.

Rudiments of Music—A. This course provides instruction in the elements of music. The following are taken up for study: clefs, signification and origin; names of pitches as established by the G-clef and F-clef; construction of major scale (without key-signature); measure signatures, note-values, rhythms; normal, harmonic, and melodic minor scales (without key-signatures); key-signatures; notation of chromatic scale with each key-signature; intervals; musical terminology.

Daily except Friday and Saturday, 8.00, Mr. SCALES.

Melody—B. Original oral melodies with their visualization; intervals; melody writing in major and diatonic scales, and with simple skips.

University credit, two hours.

Daily except Saturday, 8.00, (two sections), Mr. SWIFT, Mr. JOHNSTONE.

Melody—C. Melody writing in minor; triads; melody writing with special reference to triad suggestion; triad connection at keyboard; transposition; dominant seventh-chords.

University credit, one hour.

Section I Monday and Thursday, Section II Tuesday and Friday, Mr. SWIFT.

Melody and Harmony—D. Melody writing for two voices; connection of triads in four-voice writing in major and minor; resolution of the dominant seventh; modulations; inversions of triads and seventh-chords; harmonic analysis of compositions.

University credit, two hours.

Daily except Friday and Saturday, 9:50, (two sections), Mr. SWIFT, Mr. JOHNSTONE.

High and Normal School Music and Conducting—D. This is an advanced course to which only third-year and more advanced students are admitted. The many difficult problems which confront the music teacher in the high and normal school, are carefully studied.

Some of the topics for special consideration are: the school chorus, orchestra, glee clubs, classification of voices, grading and classification of high school students in music, oratorio in the high schools, bibliography of choral and orchestral music suitable for high and normal schools, preparation for teaching in normal and training schools, elective courses, credits for music.

A prominent feature of the work of this class is a practical course in conducting. Each student will be required to prepare and conduct choral selections under the supervision of the instructor. The work will also include instruction and practice in the reading of full scores for chorus and orchestra.

University credit, two hours.

Daily except Saturday, 8.00, Professor DANN, Professor HOERRNER.

Practice Teaching—D. Practical use of material for all grades and application of methods of teaching.

Each student will be given frequent opportunity for practice teaching under supervision of the instructor. Classes of children of different grades will be in attendance.

No student can complete the course for supervisors until he is able to demonstrate his mastery of the subject matter and methods by actual teaching. It is highly important that each student shall have had some experience in teaching in the public schools before entering this class. A year's experience as a grade teacher is invaluable and almost indispensable.

University credit, one hour.

Daily except Friday and Saturday, 8.55, Miss BRYANT.

History and Current Events—D. As announced at the 1913 Session, the course for supervisors will hereafter require a general knowledge of the history of music and a fair degree of familiarity with current events, especially in the world of music. An examination will be given to the third-year class, covering only important and well known facts concerning the development of classic, romantic, and modern music; the great composers and their principal works; contemporary composers and their best known compositions; current musical events. Any special preparation must be made at home. Hamilton's Outlines of Music History is suggested as a textbook.

Chorus. Required of all except fifth year students.

Five periods a week are devoted to chorus singing and to instruction in the technical and interpretative elements of choral music.

Topics for special consideration are: position, breathing, tone production, interpretation, and the preparation and performance of choral music by classes.

Cantatas and choruses suitable for high and normal schools will be performed by the chorus at the concerts given by the Department of Music.

Daily except Saturday 11.45, Professor DANN.

Lectures. On the technique of singing. The course will include the following topics: position, breathing, voice placing, tone emission, articulation, vocal faults. Required of all new students.

Wednesday, July 8 and July 15 at 11.45.

Friday, July 10 and July 17 at 2.15, Mr. HAYES.

Vocal Training—E. Practical vocal lessons given to individual members of the class, in the presence of all. Mr. HAYES.

Critical vowel study as applied to singing. Professor DANN.

Daily except Saturday, 8.00, (July 29 to August 13).

Musical Composition—E. Open only to those who have completed Melody C and Harmony D. This course includes instruction in the development of musical ideas (motives, themes); the logical sequence of keys; balance of parts of a composition (elementary form); essentials of good melody; song writing; the unity of text and music in rhythm and in content; song accompaniments.

University credit, two hours.

Daily except Saturday, 8.55, Mr. JOHNSTONE.

Musical Appreciation—E. Open to advanced students only. Musical artworks analyzed with a view to forming a basis for intelligent criticism.

The modern Player-piano; as an aid in musical appreciation; as an art instrument; recent applications to pedagogy; its special technique.

The Orchestra; its instruments considered separately and in combination.

University credit, one hour.

Daily except Friday and Saturday, 10.45, Mr. JOHNSTONE.

MATHEMATICS

Courses A, B, and C are planned for those teachers in secondary schools who wish to review these subjects. They are equivalent to the advanced entrance requirements of Cornell University and of the College Entrance Examination Board. They presuppose a ready knowledge of elementary algebra (through quadratic equations), and of plane geometry.

Credit, A, B, and C, three hours each.

A. **Advanced Algebra.** Except Sat., 9. White 2. Dr. OWENS. Except Sat., 10. White 29. Assistant Professor CARVER.

B. **Solid Geometry.** Except Sat., 9. White 27. Assistant Professor SHARPE.

C. **Trigonometry.** Except Sat., 8. White 6. Dr. HURWITZ. Except Sat., 10. White 5. Dr. CRAIG.

Courses D, E, and F are equivalent, respectively, to (a), (b), and (c) of course 5 in Mathematics, regularly given during the academic year. Course D presupposes A, B, and C; E presupposes D; and F presupposes a thorough knowledge of formal differentiation (the equivalent of at least Chap. II of Snyder and Hutchinson's Elementary Textbook on the Calculus). The work will consist in large part of recitations from textbooks. University credit, D, five hours; E, three hours; F, three hours.

D. **Analytic Geometry.** Daily except Sat., 8 and 11. White 1. Assistant Professor Gillespie.

E. **Differential Calculus.** Eight recitations each week. Daily, 8 and M W, 11. White 5. Dr. CRIAG. Daily, 9 and T Th, 11. White 24. Professor SNYDER. Daily, 9 and T Th, 11. White 29. Assistant Professor CARVER.

F. **Integral Calculus.** Eight recitations each week. Daily, 8 and M W, 10. White 27. Assistant Professor SHARPE. Daily, 8 and M W, 11. White 20. Dr. MCKELVEY. Daily, 10 and T Th, 8. White 2. Dr. OWENS. Daily, 9 and T Th, 11. White 6. Dr. HURWITZ.

G. **Projective Geometry.** Daily except Sat., 8. White 24. Credit, three hours. Professor SNYDER.

In this course the principles underlying projective forms and constructions of the first and second degrees will be carefully developed. Particular attention will be paid to the application of these principles to elementary geometry, so as to make the work helpful to teachers of this subject. No knowledge of mathematics beyond plane geometry will be presupposed.

H. **Advanced Calculus.** Daily except Sat., 9. White 1. Assistant Professor GILLESPIE. Credit, two hours.

A critical study of the methods of the calculus. Courses E and F are prerequisites.

K. **Teachers' Course.** Daily except Sat., 10. White 20. Credit, two hours. Dr. MCKELVEY.

Mathematical History and Pedagogy. This course is designed especially to meet the needs of teachers in the secondary schools. No knowledge of advanced mathematics will be presupposed. The work will deal primarily with methods, and with the subjects found in the best high school curricula.

PHYSICS

All work in physics is given in Rockefeller Hall. Courses 7a and 7b are special and University students may not receive credit for them. All other courses are given under the same numbers as during the regular academic year. Regular University students may take work under the same conditions as prescribed for the regular University terms and credit will be allowed as indicated below.

All courses are open to teachers who can take them with profit. Those who have not had college physics are advised to take courses 1 and 5, 10, and 7 if time permits. Those who have had college physics may take courses 6, 8, or 9, and 14, and the lectures in course 1 may be attended even if not taken for credit. Teachers are entirely at liberty to take portions of courses when such an arrangement is to their advantage. Every effort will be made to adapt the work to the needs of students and to give opportunity to profit from the exceptional equipment of the laboratory.

1. **Lectures with Experiments.** This course is intended to furnish the basis found desirable for systematic courses in textbook and laboratory. Much attention has been given to the development of demonstration apparatus for this course and even those fairly familiar with the subject may find it to their advantage to attend. The subjects for 1914 will be wave motion, sound, and light. Except Sat., 12. Lecture room B. Credit, two hours. Professor SHEARER.

5. **Recitations on Lecture Course 1.** M W F, 8. Rockefeller 105. Professor SHEARER. University credit, one hour.

This course combines supervision of note books in course 1, problems, and discussions of topics treated in the lectures.

6. **Recitation Course.** This course is open only to those who have completed course 1, or its equivalent. For the students in the Summer Session courses 8 and 9c (without course 14) are the equivalent of course 6. Credit, two or four hours.

7. **Teachers' Course.** Especially designed to meet the needs of teachers of physics in secondary schools. The course consists of two parts (either of which may be taken alone, although it is advisable to take them together) and is intended to present the subject from the point of view of the school instead of the college. As it is given in the afternoon, it may be taken in addition to many of the regular forenoon courses.

7a. **The Adaptation of Demonstration Work to High School Teaching.** Among the topics treated will be the selection of apparatus, the operation and use of the projection lantern, experiments in various branches of physics suitable for demonstration courses, simple apparatus, and the adaptation of common things to educational purposes. T Th, 2–5. Assistant Professor GIBBS.

7b. **The Purpose and Administration of Laboratory Teaching in High Schools.** Lectures and conferences. Lectures, M W F at 2, conference hours, M W F, 3–5 and forenoons by appointment. Professor HALE.

Some of the topics discussed are: the point of view in laboratory teaching, the problems adapted to experimental investigation by pupils of high school age, the adaptation of ordinary machines and devices to laboratory study, equipment of laboratories and purchase of supplies. Opportunity will be given for laboratory work if it is desired. This course will be given in the afternoon in order not to conflict with other courses in physics.

8. **Recitations in General Physics.** Theory and problems. This course includes work in mechanics, properties of matter, magnetism, and static electricity. It is to be accompanied by experiments in laboratory course 14. The course is intended to follow a first college course in general physics including lectures, demonstrations, and discussions. Course 8 is required of the engineering students of Sibley College in the first term of the sophomore year.

Credit, two hours. Prerequisite, either physics 1 and 5, or 1 and 10, and mathematics 5 or their equivalents. Except Sat., 8. Room 105. Assistant Professor GIBBS.

9. **Recitations in General Physics.** Theory and problems, continuation of Course 8. Subjects treated include current electricity, quality, capacity, induced electromotive force. Required of engineering students in Sibley College during second term of sophomore year. Except Sat., 12. Room 105. Assistant Professor RICHTMYER.

10. **Physical Laboratory.** This course is one primarily designed for teachers of elementary physics and for those students who have had or are taking a lecture course covering thoroughly elementary physical principles in the various branches. In general, the simpler forms of apparatus are used but of such a grade as to adapt them to the needs of careful investigators. The apparatus available affords study in units and their relations, statics, kinetics, molecular physics, light, sound, electricity, and magnetism. The work may at the beginning of the term be arranged for each individual, covering as many or as few of the general divisions of the subject as seems desirable. The work may be varied to meet the needs of the students as the work progresses, since in all cases individual instruction is given. Each student will thus have the opportunity to devote his energies to his chosen part of the subject. Occasional discussions of general interest may be held covering such subjects as methods of making

observations and of using them to the best advantage, accuracy of results, computations, errors, the interpretation of data by means of curves, the theory of particular experiments, and other topics as they may occur.

University students having the requisite requirements for admission to course 10 in physics as given in the Courses of Instruction for the year 1914–15 may elect this course, following the schedule prescribed for regular work during the academic year.

One to five three-hour periods a week. Except Sat., 9–12. Assistant Professors BLAKER and RICHTMYER. Credit, one to three hours.

14. **Physical Experiments.** Theory and method of physical measurements. The work presupposes a thorough course in elementary physics. It consists of setting up and adjusting apparatus and of performing fundamental experiments; a study of approximations, errors, and methods of computation; and interpretation of results, both analytically and graphically.

The apparatus available renders it possible to make accurate measurements in the different branches of general physics. A few of the subdivisions that may be covered are force, work, power, efficiency, uniformly accelerated linear and angular motions, moments of inertia, coefficients of expansion of solids, liquids, and gases, vapor tension and vapor density, the usual determinations in heat; the study of thermometers, their calibration and comparison, a thorough study of the analytical balance, including a determination of its errors and limitations. In sound, studies may be made in resonance and interference. The work in light comprises a study of lenses, the grating, the adjustment, and the use of the spectrometer, and photometry of various light sources. The equipment in electrical and magnetic apparatus is such as to afford special facilities for the determination of electrical and magnetic constants and for work in electrical measurements such as the measurement of current, electromotive force, resistance, self and mutual induction, capacity, study of the magnetic properties of iron, and the use of standard instruments of a theoretical and a practical nature.

The work, being individual, may be planned to meet the requirements of the student and may cover as many or as few topics as seem desirable. Reports on the work done covering theory and results are to be submitted for criticism. Credit from one to four hours. Prerequisite courses 1 and 6, or 1 and three hours of 10.

One to five three-hour periods a week. Except Sat., 9–12. Assistant Professors BLAKER and RICHTMYER.

25. **Advanced Laboratory Practice.** A course in general physics, open to those students who have had course 14 or its equivalent and who desire to take up special subjects for detailed study, putting much more time on individual problems than is advisable in course 14. It is intended for those teachers who desire at some time to do advanced laboratory work in research, and for teachers in laboratory physics in colleges. Such problems in research as can be completed in the time avilable may be undertaken by special arrangement.

Among the fields of special interest for which facilities are available may be mentioned: measurement of very low and of very light temperatures; properties of materials at high and low temperatures; the production and measurement of X rays and their applications. Measurement of light and illumination including spectrophotometry, etc.

Credit varies with the amount of work done. The laboratory will be open daily from 9 to 12, excepting Saturday. Directed by members of the staff in each special field.

CHEMISTRY

All courses are given in Morse Hall. L. R. = Lecture Room.

The courses announced below correspond as follows to regular University courses: A to course 1; B to part of 48; C and E to 6; C and D to 7; E (with part of F) to 12; F to 14; G to 17; H to 19; I to 20; J and L to 30; K and M to 31; N to 37; R to 65; S to 66; T to part of 69.

The recitation and laboratory work will be arranged, within reasonable limits, to meet the individual requirements of teachers registered in the respective courses. For students wishing to obtain University credit, the requirements for admission to the courses will be the same as during the regular University sessions. For teachers not intending to have their work apply toward a Cornell degree, these requirements will not be rigidly enforced.

A. **Introductory Inorganic Chemistry.** a. Lectures except Sat., 12. L. R. 1. Professor BROWNE and Mr. DAVIS. The lectures deal with the fundamental theories and laws of chemistry and with the more common elements and their compounds. They are profusely illustrated by experiments. The course is primarily designed to meet the needs of teachers in secondary schools, and to that end emphasis is laid upon methods of lecture presentation and experimental demonstration. Students other than teachers must, before registering, satisfy the department that they are properly prepared to carry on the work.

b. Laboratory work, M W, 8–12, and T Th F, 9–12. Dr. WELSH and Mr. OVERMAN. A series of experiments designed to illustrate the fundamental laws of chemistry and to acquaint the student with the properties of the principal elements and their compounds. For the benefit of teachers who may take the course especial attention will be given to methods of laboratory instruction, qualitative experiments, and the blowing of simple glass apparatus.

c. Recitations. T Th F, 8. Recitation Room B. Dr. WELSH. The recitations deal with the subject matter of the lectures and with the experimental work in the laboratory; thorough drill in the solution of chemical problems. Credit, six hours.

B. **Selected Topics in Advanced Inorganic Chemistry.** Lectures, M W F, 10, L. R. 2. Credit, one hour. Dr. WELSH. Experimental lectures dealing with various topics in the field of general and inorganic chemistry, and covering some of the more important recent advances.

C. **Qualitative Analysis.** Lectures, M W F, 11, L R. 4. Dr. LEMON. Laboratory, except Sat., 1.30–4.30, Dr. LEMON and Mr. RAY. An elementary course for those who have had the equivalent of course A. A study in laboratory and class room of the methods for detecting and separating the principal bases and inorganic acids. This is followed by the analysis of various substances, either in solution or in solid form, the composition of which is unknown to the student. Considerable emphasis is laid upon the writing of equations expressing the reactions involved in the work. Credit, three hours.

D. **Qualitative Analysis.** Lectures and recitations. T Th, 8, L. R. 2. Dr. LEMON. Laboratory work for students taking courses C and D with the intention of securing the equivalent of the regular University course 7. Daily, except Sat., 1.30–4.30, and M W F, 8–11. For students taking work in course D alone, afternoon periods only. Dr. LEMON and Mr. RAY. Credit, one, two, or three hours. 1. A study in laboratory and class room of the methods of detecting each of the important acids in the presence of the others, together with the reactions involved, followed by the analysis of more complex mixtures than those assigned in course C. 2. A comparative study in the laboratory of different methods of detecting and separating the bases.

E. **Quantitative Analysis.** Elementary. Lectures, T Th, 11, L. R. 4. Laboratory, M W F, 8–11. Credit, two hours. Assistant Professor LUNDELL and Mr. VANDER MEULEN.

An introduction to quantitative methods and the chemistry upon which these methods are based. Lectures, explanatory of the methods used, are first given; each student then performs simple analyses which involve the use of the apparatus ordinarily employed in analytical work.

Advanced work (see course F) may be taken by students who complete this course before the close of the session.

F. **Quantitative Analysis.** Advanced. Laboratory practice at hours to be arranged. Credit, one, two, three, or four hours. Assistant Professor LUNDELL and Mr. VANDER MEULEN.

This course comprises instruction in certain gravimetric, volumetric, and electrolytic methods of analysis, and in the methods of combustion analysis. The work includes the analysis of iron ores, iron and steel, slags, paints, lubricants, coal and coke, cements and cement materials, alloys, ores of copper, lead, zinc, mercury, manganese, tin, etc.

G. **Opticochemical Methods.** Lectures, except S., 12, L. R. 3. Laboratory practice at hours to be arranged. Credit, three hours. Dr. ANDERSON and Mr. ENGELDER.

The lectures deal with the construction and with the use in chemical analysis of the spectroscope, colorimeter, polariscope, and refractometer. The laboratory instruction includes the following work: the observation and mapping of emission spectra of various elements in the Bunsen flame, the oxy-hydrogen flame, the electric arc, and the electric spark; the qualitative analysis of mixtures and minerals with the aid of the Krüss spectroscope and the direct vision spectroscope; the observation and mapping of absorption spectra; the examination and identification of rare earths and of organic dyes in solution, by means of their absorption spectra; the calibration of spectroscopes; spectrum photography with the Hilger wave-length spectrometer and with the Steniheil grating spectrograph; and practice in the use of colorimeters, polariscopes, and refractometers of various types.

[H. **Qualitative and Quantitative Gas Analysis.** Lectures. Credit, two hours. Dr. ANDERSON.

A detailed discussion of many representive types of apparatus employed by the gas analyst, and of the various methods of analysis involved in their use. Numerous simple problems are assigned which afford practice in the cal-

culation and interpretation of the results obtained in gas-analytical work.] Not given in 1914, but will be given in 1915.

[I. **Technical Gas Analysis.** Laboratory practice. Credit, two hours. Dr. ANDERSON and Mr. ENGELDER.

The analysis of gas mixtures with the apparatus of Honigmann, Bunte, Orsat, Winkler, and Hempel; the complete analysis of flue gas; illuminating gas, generator gas, acetylene, and air; the determination of the heating power of gaseous, liquids, and solid fuels, and the analysis of various substances by gas analysis methods involving the use of the different types of gas evolution apparatus such as the Scheibler calcimeter, the Hempel, and the Lunge nitrometer, the Lunge gasvolumeter, and the Bodländer gasbaroscope. Within certain limits the work may be selected to suit the requirements of the individual student.

Courses H and I should be taken at the same time.] Not given in 1914, but will be given in 1915.

J. **Organic Chemistry.** Aliphatic compounds. Lectures and recitations, except Sat., 8, L. R. 3. Laboratory practice at hours to be arranged. Credit, four, five, or six hours. Professor ORNDORFF, Mr. MAHOOD, and Mr. KENNEDY.

K. **Organic Chemistry.** Aliphatic compounds. Lectures and recitations. Except Sat., 8, L. R. 3. Credit, two hours. Professor ORNDORFF and Mr. KENNEDY.

These lectures and recitations are the same as those of course J. Course J should be taken in preference to course K whenever it is possible.

L. **Organic Chemistry.** Aromatic compounds. Lectures and recitations, except Sat., 10, L. R. 3. Laboratory practice at hours to be arranged. Credit, four, five, or six hours. Mr. MAHOOD and Mr. KENNEDY.

Courses J and L presuppose a knowledge of elementary chemistry, and L must be preceded or accompanied by J. These courses may be taken together or course J may be taken one summer and course L the following summer.

M. **Organic Chemistry.** Aromatic compounds. Lectures and recitations, except Sat., 10, L. R. 3. Credit, two hours. Mr. MAHOOD and Mr. KENNEDY.

These lectures and recitations are the same as those of course L. Course L should be taken in preference to coure M whenever it is possible.

N. **Methods of Organic Analysis.** Laboratory practice with occasional lectures. Hours to be arranged. Credit, two or more hours. Professor ORNDORFF and Mr. MAHOOD.

This course comprises the qualitative and quantitative analysis of pure organic compounds, and of such commercial products as alcohols, ethers, organic acids, glycerol, formalin, acetates, soaps, turpentine, rosin oils, etc.

R. **Microchemical Methods.** Laboratory practice at hours to be arranged. Credit, two hours. Mr. ———.

The aim of this course is to familiarize the student with the use of the microscope and its accessories, and with microchemical methods and apparatus as applied to chemical investigations.

S. **Microchemical Analysis.** Elementary course. Laboratory practice at hours to be arranged. Credit, three hours. Mr. ———.

Practice in the examination and analysis of inorganic substances containing

the more common elements, with reference to rapid qualitative methods and the analysis of minute amounts of materials.

T. **Elementary Sanitary Chemistry.** Lectures, recitations, and laboratory practice. Credit, five hours. Lectures except Sat., 9. Room 89. Recitations and laboratory at hours to be arranged. Dr. REDFIELD.

The course is planned to serve as an introduction to the methods and objects of chemical science as applied to the problems of public health. The work during the summer session of 1914 will comprise: elementary water and sewage analysis; commercial disinfectants; common poisons and habit-forming drugs.

Course T is the equivalent of the first term of course 69 given during the regular University session, and presupposes a knowledge of qualitative and quantitative analysis, and of organic chemistry.

Z. **Teachers' Course.** Lectures and conferences. Lectures T Th at 2, Lecture Room C; conference hours T Th, 3–5 and forenoons by appointment. Professor HALE.

This course is especially designed to meet the needs of teachers of chemistry in secondary schools. Among the topics considered will be the spirit of the teaching of chemistry in the high school, the adaptation of chemistry to the needs of the pupils; the purpose of experimental work, both as demonstration and as laboratory work; suitable laboratory problems and the equipment adapted to the needs of the modern course in high school chemistry.

GEOGRAPHY AND GEOLOGY

A special, illustrated announcement of the Department of Geography and Geology is published giving full details of the work of the department, outlining in particular the excursion possibilities and pointing out the advantages of the Cornell regions for the study of these two sciences in the Summer Session. This special announcement will be sent post-free on application to the Director of the Summer Session.

The Lecture Rooms and Laboratories are in McGraw Hall. It is the purpose in this department to meet, primarily, the needs of teachers in grammar schools, high schools, normal schools, and colleges. A second aim is to provide courses of practical and cultural value to college students. The work embraces lectures, laboratory, and field instruction in physical, regional, industrial, and commercial geography; and in mineralogy, lithology, structural geology, and paleontology.

The environs of Cornell University are rich in phenomena of geographic and geologic interest. Consequently field excursions are made an especially important part of the work of this department in the Summer Session.

The laboratories are well equipped with apparatus and illustrative material for class instruction and research. As such may be enumerated teaching and reference collections of minerals, rocks, fossils, maps, photographs, models, and more than five thousand lantern slides.

For entrance credit (½ unit) in physical geography, a student is required to attend, complete all required work, and pass the examinations in courses: A, H, and J.

Special Illustrated Lectures. Each year the department offers three or more illustrated lectures on geographical or geological subjects of wide popular interest.

These lectures are open to all students in the department and their friends. Details in regard to these lectures will be found in the special announcement of the department. Early in the 1914 Session Assistant Professor von Engeln will give an illustrated lecture on the "Earth History of the Cornell Region." This lecture will be open to all and will serve as a general introduction to a scientific appreciation of the scenery of the Cornell Region.

Round Table Conferences in Geography and Geology. Of especial interest to teachers and supplementary to the regular course work bearing on their problems are the several Round Table Conferences held during the Session. These are led by one of the professors in the department (Professor Carney in 1914) and consist of informal discussions by all those present of important topics relating to the teaching of geography and geology.

LECTURE AND RECITATION COURSES IN GEOGRAPHY

A. Physical Geography. An introductory course in physical geography covering most of the subjects treated in the modern texts, but touching more fully on the general concepts and the theoretical side of the subject than is possible in a high school book. Some of the topics treated are the general form of the earth, origin and distribution of relief features, processes and progress of the physiographic cycle and the resultant development of land forms, configuration of the ocean basins, nature and effects of the continental glaciation, and the bearing of these various phenomena on life relationships. If time permits the meteorological side of the subject will be touched upon, also, but students interested are advised that special courses in meteorology are offered in the College of Agriculture, Summer Session. See regular announcement.

The lectures in physical geography are fully illustrated by lantern slides, wall and globe maps. Students registering in this course are advised to take also the related courses, H and J. M T W Th, 9. Geological Lecture Room. Assistant Professor VON ENGELN. Credit, two hours.

B. Industrial and Commercial Geography. Adapted to the needs of teachers in high and grammar schools. This course includes a brief consideration of the history of commerce, the causes underlying the growth of industry and commerce, and a discussion of the distribution of the leading commercial products. A larger amount of time will be given to the leading facts of the industrial and commercial geography of the United States, the British Empire, Germany, France, Russia, China, Japan, Argentina, and Brazil. Each member of the class will make a study of some one selected topic and submit a report. Local excursions will be made for the purpose of studying certain industries at first hand. Museum materials and lantern slides will also be employed.

M T W Th, 8, Geological Lecture Room, with additional time for conferences and excursions to be arranged. Professor CARNEY. Credit, two hours.

C. Geography of North America. This course is designed to give teachers of regional geography and others a broad conception of continental evolution and the geographic adaptation of North America for human occupation. The structure, physiographic history, topographic expression, climate, and natural resources of the different geographic provinces are considered in their relation to exploration, development, history, relation to industry and agriculture and to the location and

growth of cities and routes of commerce. Needs, opportunities, and methods of conservation and reclamation are treated in their geographic relation. References and reading assignments to the literature of the subject on particular topics are given special attention. The course is fully illustrated with lantern slides, maps, and models.

M T W Th, 10, Geological Lecture Room. Assistant Professor VON ENGELN. Credit, two hours.

D. Aims and Methods in Geography. Primarily for normal school and grade teachers. Lectures and discussions on such topics as Home Geography; the earth as a planet; Mathematical Geography; placing the emphasis; the plan and purpose of reviews and tests; thought, memory and drill work; the making and studying of maps; visual instruction; field lessons; supplementary reading; employing and directing children's geographical interests; the inter-relations of phypical geography and human geography; the claims of commercial and of regional geography.

M T Th, 11, Physical Geography Laboratory. Professor CARNEY. May be taken for one hour credit.

LECTURE AND RECITATION COURSES IN GEOLOGY

E. Elementary Geology. A general introductory course. Some of the topics discussed are: general features of the earth; the earth in space, its origin and relation to other heavenly bodies; igneous, sedimentary and metamorphic rocks; geologic structure, the geologic evolution of continents and ocean basins, the great periods of geologic history with special reference to the development and evolution of type life forms. Emphasis will be put on the evolution idea as exemplified in geological science by the origin of the earth and the appearance, development, and extinction of various organic forms. An appreciation of these things is of fundamental importance in a knowledge of nearly all modern science. The lectures are fully illustrated by lantern slides, models and specimens. Students are advised to take also the related courses, F, I, and J.

M T W Th, 11, Geological Lecture Room. Professor PERRINE. Credit, two hours.

F. Minerals and Rocks. An elementary course leading to an acquaintance with the properties and more important uses of the substances forming the earth's crust. Emphasis is laid upon the laboratory work, to which a large portion of the time will be devoted. Each student will be given seventy-five minerals and a smaller number of rock specimens for identification by means of their physical properties. Some time will be spent in examining the large University collection of these same substances. It is thus possible to become familiar with the more common types by actually handling many specimens of each. Arrangements may be made with the instructor in charge for the purchase of a set of the minerals and rock specimens for school or private study.

Lectures T Th, 10, General Geology Laboratory. Laboratory practice, W, 2–5, F, 9–12. Professor PERRINE and Mr. MONNETT. Credit, two hours.

G. Field Research and Teachers' Course in Geology. This course is designed first, for those who desire to do field work in making contoured geologic maps, or

in collecting and identifying fossils from the region about Ithaca; second, for advanced students wishing to do research work in fossils, etc.; third, for teachers who wish to become familiar with the literature of geology, especially of their home regions, or to outline courses adapted to schools in their home regions. Hours to be arranged to suit the individual's needs. Professor PERRINE. Credit, one or more hours.

LABORATORY AND EXCURSION COURSES IN BOTH GEOGRAPHY AND GEOLOGY

H. Physical Geography, Laboratory Course. The members of this class will make a systematic study of the Physiographic Regions of the United States using contour maps, models and the experimental laboratory of the department in a laboratory study of the subject. By such study the topographic, regional, and life relationships (human, animal and plant) of the geography of the United States will be correlated and presented as an orderly whole. The course will prove of worth to grade teachers of geography who wish to obtain a broader basis for their work in the subject, as well as for those who expect to teach geography in the high schools.

A laboratory fee of $1.00 must be paid to the Treasurer at the beginning of the session to cover laboratory maintenance. T Th, 2–4. Physical Geography Laboratories. Mr. ELSTON. Credit, one hour.

I. Elementary Geology, Laboratory Course. In this course a laboratory study will be made of the most common rocks and minerals comprising the main mass of the earth's outer shell; of geologic structure as shown by contoured geologic maps and models; and of the life forms developed in each geologic period. Short field excursions will be made to collect specimens, especially fossils, from various horizons near Cornell University, where the rocks are especially rich in such remains.

A laboratory fee of $1.00 must be paid to the Treasurer at the beginning of the Session to cover laboratory maintenance expenses.

T Th, 2–4, General Geology Laboratory. Professor PERRINE and Mr. MONNETT. Credit, one hour.

J. Geography and Geology, Field Course. This course should be elected by all those registering in course A or E, and is required of all those desiring university credit in those courses and also of those who desire entrance credit in physical geography. With courses A and H it affords a comprehensive course in physical geography; with courses E, F and I it will give a similarly broad training in elementary geology, as the dynamic phases of geology are emphasized on the excursions. Mimeographed outlines of the excursions are to be secured by each student desiring credit.

Students not registered in the course or department are invited to attend these excursions but must conform to the directions of those in charge. Those desiring University or entrance credit must take field notes and hand in written reports. Excursions 1–6 are required of all students in the course, and in addition they must make either two of 7, 8, and 9; or one of 10 and 11 for one hour's credit.

Meeting place and time announced in mimeographed outlines or by bulletin. Meet for first excursion Monday, July 6th, (1914) at Geological Lecture Room

McGraw Hall 2:30 p. m. Excursions 1–6, Monday afternoons; 7, 8, 9, all day Saturday; 10 and 11 Friday and Saturday.

The longer excursions will be under the general charge of Assistant Professor von Engeln with the co-operation and assistance of the other members of the instructing staff. The afternoon excursions will generally be led by one of the three professors with such assistance as may be necessary. On the excursions stops will be made at points of interest, explanations made, questions asked and discussion invited.

OUTLINE OF EXCURSIONS—Course J

Monday Afternoons

1. Campus and Vicinity. To study the action of streams and the progress and form of valley development. Visiting Alumni Field, upper Cascadilla Gorge, and Goldwin Smith Walk.

2. Eagle Hill. To become acquainted with the lay of the land about Cornell, to learn the place names of the broader physiographic features, studying, enroute, processes of weathering and, at the summit, the maturely dissected plateau. The top of the hill is a vantage point from which a good view of the lake and the land for miles to the north, east, and west may be had.

3. Fall Creek and Deadhead Hill. To study the origin and nature of sedimentary rocks, also processes of erosion, transportation, deposition and cementation. An intimate view of one of the large gorges and its especial features, particularly Ithaca Falls.

4. Shore of Cayuga Lake. Expense $.15 to $.20. To study shore line phenomena, joint planes, bedding and stalactite formation. A walk for several miles along the east shore of the Lake. Probably return by trolley.

5. Portland Point by Trolley. Expense $.50 to $.75. To study rock structure and kind, fossil content, residual soil, glacial striations. A visit to a large cement rock quarry at a point where the rocks have been locally broadly upfolded.

6. Six Mile Creek. To study the effect of glaciation on a stream course. Relations to water supply and power development. A climb into and walk through one of the gorges in Six Mile Creek and an interpretation of its complicated physiographic history.

All-Day Excursions

7. Cayuga Lake, Taughannock Gorge and Falls. By boat. Expense about $.75. To study the Inlet Plain, its reclamation, the Barge Canal terminal, the position and succession of the Devonian strata along the lake shore and the deep gorge and falls of Taughannock. A sail along the west shore of the lake and a walk through the great gorge to Taughannock Falls, one of the highest straight falls east of the Rockies. Luncheon at the base of the falls.

8. Enfield Gorge and Falls. By wagon. Expense about $1.10. To study the relations of preglacial and hanging valleys and the post glacial and interglacial gorges, their origin and features. Joint plane guidance of stream courses.

A ride to the head of the gorge, climb through it to the crest of Lucifer Falls. Enfield is perhaps the most picturesque and wildest of the gorges in the Cornell Region.

9. Two distinct and separate excursions constitute No. 9:

A—Freeville. By wagon. Primarily for geography students.

B—Union Springs. By boat. Primarily for geology students.

These two excursions may need to be conducted on the same day, but it is usually possible to go to Freeville on Friday and to Union Springs on the Saturday following.

A—Freeville. Expense about $1.10. To study the mature upper Fall Creek valley and its glacial deposits primarily those due to outwash from the melting ice and to note the bearing of these on agriculture. A drive along the course of Fall Creek. In the afternoon a visit is usually made to the George Junior Republic. In charge of Professor Carney (1914).

B—Union Springs. Expense about $1.10. To study the Silurian and Devonian rock exposures along the shores of Lake Cayuga; collection and interpretation of fossils from the various horizons and a study of the stratigraphy in its relation to economic geology. In charge of Professor Perrine (1914).

Longer Excursions

10. Niagara Falls and Gorge. By special train and trolley cars. Expense between $8.00 and $10.00. Over night at Niagara Falls.

All the important scenic features of Niagara Falls and Gorge are visited and their physiographic history interpreted. As a whole these phenomena constitute a striking record of some of the most interesting chapters in the geologic and physiographic history of North America. Before the trip a special meeting of those interested will be held in the Physical Geography Laboratory when the relations of the different places will be explained and illustrated by large scale relief model of the Niagara Region. Students are advised to send to Director, U. S. Geological Survey, Washington, D. C., for a copy of Niagara Folio, No. 190, in octavo form, cost $.50 in coin or money order.

There may be opportunity for such part of the class as is interested primarily in industrial and commercial geography to see something of the power development at Niagara and for the stratigraphic geologist to collect fossils from the great Niagara Gorge section but the main portion of the class will devote its attention to the dynamic geology and physiographic interest of the region.

11. Watkins Glen. By special train. Expense about $2.00.

Watkins Glen is considered one of the most beautiful in the country. It has been secured for a state park by New York and all parts of it made accessible. The excursion party will study the gorge, its pot holes and falls in detail; and consider its relations to the Seneca Lake Valley in comparison with the conditions at Ithaca as referred to the Cayuga valley. Train ride across the dissected upland country to the south and west between Ithaca and Watkins.

ZOOLOGY

A. **General Zoology.** An elementary course designed to meet the needs of teachers and those wishing to gain a general knowledge of the subject. The earlier part of the course aims at familiarity with the fundamental principles of animal functions and morphology. In addition the course deals with a comparative study of development and structure, systematic position, habits, and life-histories of animals. The laboratory periods will be devoted to a study of their form and structure. As far as possible every phase of the subject will be illustrated by a study of the living animal. Lectures, except Sat., 9. McGraw Hall, Room 5. Five laboratory periods, except Sat., 2–5.30. Laboratory fee, $5.00. Credit, five hours. Assistant Professor REED, and Drs. WRIGHT and ALLEN.

B. **Ornithology.** A course concerned with the various phases of bird life. The lectures will discuss such subjects as migration, coloration, molt, habits, nests, eggs, care of young, structure and toponomy, flight, general bird-ecology and ecological groups, bird photography, preparation of study material, economic importance, methods of attracting birds, protection, game propagation and conservation, and geographical distribution. The aim of the field work is the identification of birds in their haunts and observations upon habits. Representatives of the important families of North American birds will be studied in the laboratory with the aid of a manual. Each student should be provided with Chapman's Handbook of Birds of Eastern North America and with field or opera glasses.

Lectures, T Th, 11, McGraw Hall, Room 5. Laboratory is open, except Sat., 2–5. Field work in two sections. Credit, three hours for lectures, and two laboratory and two field periods of two and one-half hours each. The lectures may be taken separately or any combination may be made according to the needs of the student. Laboratory fee, $1.50. Assistant Professor REED, and Drs. WRIGHT and ALLEN.

B. **Advanced Work.** An opportunity for advanced work and research is offered to those who are qualified. The laboratory will be open from 8 to 5 except Saturday.

SHOP WORK AND DRAWING FOR ENGINEERING STUDENTS

Drawing

For further information regarding course C, apply to Professor Pond; for information regarding the drawing and shop courses apply to Professor Kimball, 205 Sibley.

A. **Mechanical Drawing.** A course in drawing for beginners, covering use of instruments, orthographic and isometric projection, inking, tracing, conventions, working drawings, M W F, 8–11 and except Sat., 2–5, Sibley 203. Mr. ———.

B. **Machine Sketching and Drawing.** A more advanced course in mechanical drawing for those who have had the equivalent of course A. Sketching of machine parts, machine drawing from sketches, empirical design. This course is an application of the work in course A to such machine designing as can be done without a knowledge of mechanics. M W F, 8–11 and except Sat., 2–5, Sibley 203. Professor KIMBALL and Mr. ———.

C. **Descriptive Geometry.** Lectures or recitations, daily except Sat., 8. Drawing daily, except Sat., 9–12. Lincoln Hall. Assistant Professor POND.

A study of the representation of lines, planes, surfaces, and solids, and their interrelations. Warped surfaces. Tangencies. Intersections, shades and shadows, and perspective. The work is the same as is given in the regular C. E. course 1, and the student will receive five hours credit if he takes the whole course. A three hour course that does not include shades and shadows, and perspective and fulfills the requirements for the Mechanical Engineering students of Sibley College will also be given. The latter will be given from 2–5 p. m. if there are students enough to make up an extra section.

Shop Work

A. **Pattern Making.** Use of woodworking tools; elements of pattern making. Mr. HOOPER.

B. **Foundry Work.** Moulding, casting, mixing of metals, operation of cupola, etc. Mr. VANDERHOEF.

C. **Forge Work.** Forging, welding, tempering, etc. Mr. HEAD.

This course will be given only if the registration is large enough to warrant it.

D. **Machine Work.** Use of measuring tools; hand and machine tools; fitting and assembling.

Each of the above daily, except Sat., 8–11, 1–5, and Sat., 8–11. Mr. WELLS and Mr. BUCK.

E. **Manual Training.** The scope of the foregoing courses in shop work is the same as that of the corresponding courses given to the regular Sibley College students. They are intended for prospective or actual engineering students. In addition to these, special courses are offered in each shop, designed to meet the wants of manual training teachers, and given in close connection with the technical work of manual training. (See pp. 17, 18). Teachers having special needs may have courses laid out to suit their wants. At the same time it is greatly to their advantage to see the work as given to the regular engineering students.

MECHANICS OF ENGINEERING

The courses in mechanics given in the Summer Session are designed primarily for those students in Cornell University who have taken mechanics in regular University classes in the College of Civil Engineering or in Sibley College but who have received a condition therein (that is a mark of 41–59). Students other than those mentioned above must satisfy the professor in charge that they are qualified to take the work before they can be registered in these courses. The courses A and B are considered the equivalent of Course 20 in the College of Civil Engineering, or of Courses M 5 and M 6 in Sibley College.

Textbooks: Church's Mechanics of Engineering, and Notes and Examples in Mechanics, supplemented by other printed notes and problems.

A. **Mechanics.** Statics of a material point and of rigid bodies. Centers of gravity. Chains and cords. Dynamics (kinetics) of a material point. Centri-

fugal and centripetal forces. Moments of inertia of plane figures and of rigid bodies. Dynamics (kinetics) of rigid bodies. Work. Power. Energy.

Lectures, recitations, and problems, two hours daily, 8–10. Credit, five hours. Lincoln Hall 24. Assistant Professor RETTGER.

B. **Mechanics.** Friction; graphical statics of structures and mechanisms; stress and strain; strength and elastic properties of materials in tension, compression, and shearing; torsion; bending moment, safe loading, deflection and resilience in simple and continuous beams.

Lectures, recitations, and problems, two hours daily, 10–12. Credit, five hours. Lincoln Hall 24. Assistant Professor RETTGER and Mr. BRAUNER.

C. **Engineering Problems.** Credit, two hours. Prerequisites: Mechanics 20 and Hydraulics 23, or their equivalents. This course is the equivalent of course 29, College of Civil Engineering. Computations and reports. Three hours daily except Sat. Lincoln Hall 22. Assistant Professor RETTGER and Mr. BRAUNER.

BRIDGE AND STRUCTURAL ENGINEERING

C.E. 71. **Structural Design and Bridge Stresses.** Credit, two or four hours. Prerequisites: Mechanics 20. One-half of the course includes structural details, i.e., the design of a wooden roof truss and of other timber joints. The other half of the course includes dead load, live load, wind load, and impact stresses in simple bridge trusses due to uniform live panel loads, locomotive axle loads, and road roller loads. This course is equivalent to first term C. E. 71. Lectures, recitations, computations, and drawing at hours to be assigned. Lincoln Hall 22 and 29. Messrs. BURROWS and URQUHART.

C.E. 71. **Bridge Design.** Credit, four hours. Prerequisites: Structural Design and Bridge Stresses. Computations and drawing for the complete design of a riveted railroad bridge truss, the stresses for which were computed in connection with the previous work in Bridge Stresses. The computations to determine the sections of all members, of pins, pin plates, splices, and other details as well as of connecting rivets are to be written up in the form of systematically arranged reports. The drawings consist of general detail plans showing the location of all rivets as well as the composition and relations of all members and connections. The final report is to give a full list of shapes and plates and a classified analysis of weights for the span. Lectures, computations, and drawing at hours to be assigned. Lincoln Hall 14 and 22. Messrs. BURROWS and URQUHART.

C. E. 72. **Reinforced Concrete Arch.** Credit, three hours. Prerequisites: Mechanics 20, and that portion of course 71 which deals with elementary graphic statics. The design of an arch of reinforced concrete including the abutments and centering. Lectures, computation, and drawing, at hours to be assigned. Lincoln Hall 14. Messrs. BURROWS and URQUHART.

This course may be substituted for Engineering Design, C.E. (91f).

C.E. 77. **Concrete Construction.** Credit, three hours. Prerequisites: Mechanics 20. Textbook, Principles of Reinforced Concrete Construction by Turneaure and Maurer. The object of this course is the study of the funda-

mental principles underlying the rational design of reinforced concrete structures including centering. Recitations, computations, and drawing at hours to be assigned. Lincoln Hall 14 and 29. Messrs. BURROWS and URQUHART.

HYDRAULICS

The instruction in theoretical hydraulics given in the Summer Session covers the same field as the regular course, C.E. 23, required of all juniors in the College of Civil Engineering, except that no laboratory demonstration lectures are given. It is intended as a course in systematic tutoring for students in Civil Engineering who have attended the course during both first and second terms and have failed to attain a passing mark in either term's work. Full University credit can not be given to such persons for work in the Summer Session, except as noted below.

As arranged for the summer schedule, the work of the fall term is covered fully by the classes meeting each morning at 8 o'clock (six times a week), and the second term's work is covered by the class meeting from 12 to 1 daily except Saturday.

Students in Sibley College, desiring credit for the equivalent of Course M 12 (2 hours credit), may, with the sanction of the Committee on Summer School Studies of Sibley College, arrange to take work of the same scope as the Sibley Course as follows: From July 6 to 27 from 8 to 9 a. m. daily, and from July 27 to August 14, from 12 to 1 o'clock daily except Saturday.

Registration for the Summer Session in hydraulics should be made with Professor F. J. Seery, 33b Lincoln, preferably before the close of the spring term.

Course A. Hydrostatics; measurement of pressures; strength of pipes; dams and retaining walls; earth pressures; immersion and flotation; pneumatics of air motors and compressors; barometric levelling, etc. Daily except Sat., 12. Lincoln 21. Assistant Professor SEERY.

Course B. Hydraulic motors and flow of water through pipes and orifices and over weirs; fluid friction and loss of head; general application of Bernouilli's Theorem; steady flow in open channels; use of Kutter's and Church's Diagrams; hydraulics of machinery; waterwheels; impulse wheels; reaction turbines; theorem of flow through rotating casing; power, speed, and discharge of turbines; to theory of testing motors, etc. Daily, 8. Lincoln 21. Assistant Professor SEERY.

COURSES IN THE COLLEGE OF AGRICULTURE

The New York State College of Agriculture provides the following courses of instruction under the rules and regulations that follow.

1. **Admission.** There is no examination for admission, but applicants must satisfy the instructor in charge of any course which he seeks to enter that he is qualified to pursue the work of the course.

2. **Attendance and Registration.** Students must conform to the regulations on page 6. As soon as registered with the Registrar in Morrill Hall, each student must report at the office, room 122, Main Building, College of Agriculture.

3. **Tuition and Fees.** Tuition in any of the courses following is free to residents of New York State, and to students registered in the Graduate School for graduate work in Agriculture only. All others will pay a tuition fee of $30 whether one subject or more be taken. For the time and place of payment, see page 7.

In some of the courses a fee to cover the cost of materials used will be charged. Fee cards must be procured from the instructor at the first exercise, and returned to him receipted within five days.

4. **Academic Credit for Work.** For the requirements for the degree B.S. (8 terms, 120 hours, etc.) see the Announcement of the College of Agriculture. For graduate work, see page 8.

AGRICULTURE

B. **Agriculture for High Schools.** Credit, three hours. Open to teachers; other persons must obtain special permission before registering. Lectures, M W F, 9. Laboratory and seminary, daily except S, 2–4.30. Farm Management Laboratory, Poultry Building. One of the laboratory periods each week will be a seminary. Mr. GETMAN.

Lectures, laboratory practice, and discussions on agriculture for high schools. Four of the laboratory periods will ordinarily be devoted to the study of some of the more important principles of agriculture. One laboratory period will be devoted to a seminary for discussion of problems that arise in teaching agriculture. Throughout the course, methods of instruction will be considered along with subject matter.

Owing to the fact that there will be some duplication of work for which credit has already been received, juniors and seniors in the College of Agriculture who complete the work of this course will receive only two hours credit.

C. **Agriculture for Elementary Schools.** Credit, two hours. Open to teachers; other persons must obtain special permission before registering for the course. Lectures, T Th, 9. Laboratory, M W, 10–12.30. Seminary, F, 10–12.30. Farm Management Laboratory, Poultry Building. Mr. GETMAN.

Lectures, laboratory practice, and discussions on subject matter of agriculture for elementary schools, methods of teaching, and correlation of agriculture with other subjects.

ANIMAL HUSBANDRY

A. **Principles and Practice of Feeding Animals.** Credit, two hours. Lectures, M W F, 10. Practice, T Th, 10–12.30. Animal Husbandry Building. Professor SAVAGE.

The general principles of animal nutrition, based on Jordan's Principles of Human Nutrition as a text. The discussion of these principles will occupy most of the time given to lectures. The practice of feeding animals, based on Henry's Feeds and Feeding as a text. The discussion of the practice of feeding horses, cattle, sheep, and swine will occupy most of the time given to laboratory work, which will include also the study of feeding standards, the study of about forty home-grown and commercial feeds, the formulation of rations, and the like.

B. **Principles of Animal Breeding, and Elementary Judging.** Credit, three hours. Lectures, daily except S, 9. Laboratory, T Th, 2–4.30. Animal Husbandry Building. Professor HARPER.

A general discussion of the principles of heredity as applied to the breeding of animals, with a study of animal form; origin and formation of breeds; crossing and grading, with an outline of the methods of registration and the study of records and pedigrees. Demonstrations, essays, and reports will be required in addition to the lectures.

The laboratory work will include practical handling of animals, and methods of scoring and judging. Types and several breeds, particularly of dairy cattle, will be illustrated.

BIOLOGY

A. **General Biology.** Credit, three hours. Lectures, daily except S, 11. Main Building 392. Laboratory and field work, sec. A, M W F, 2–4.30; sec. B, T Th, 2–4.30, S, 8–10.30. Main Building 302. Assistant Professor JOHANNSEN and Mr. VICK.

This is an elementary course designed to acquaint the general student and the prospective teacher with the principal ideas of biology through selected practical studies of the phenomena on which biological principles are based. The chief types of both the plant and the animal series are studied in logical sequence, with particular attention, in both lecture and laboratory, to such topics as the interdependence of organisms, the simpler organisms, organization and phylogeny, heredity and variation, natural selection and adaptation, segregation and mutation, the life cycle, metamorphosis and regeneration, and the responsive life of organisms. Laboratory fee, $2.50.

BOTANY

The courses in botany are planned to meet the needs of high school and college teachers, as well as to furnish information for persons not intending to teach.

The work will consist of lectures, laboratory work, and field work. The lecture and classroom work will be supplemented by lantern slides, charts, microscope slides, and museum and herbarium material. It is likely that some round-table discussions will be arranged.

The region about Ithaca is especially rich in plant life. Rarely, if ever, is a locality found that is better adapted for summer field work in botany. The richness of the fungous and algal floras, as well as the great number of mosses, liverworts, ferns, and flowering plants, renders field work here especially attractive and valuable. Special attention is given to the field botany, although other phases of the work are not ignored.

The country in the vicinity of the University is very diversified, marshes, fields, woodlands, ravines, and bogs all being accessible for day trips. Many short field trips will be taken, and several longer all-day trips. Some of these will be in rough and wild localities, and clothing suitable for such trips should be provided. Women will frequently find the bloomer costume convenient.

The all-day trips will occur on Saturdays and will entail an extra expense of 50 cents to $1.50 for each; one of the trips will cost $2.50.

A. **Elementary Botany.** Credit, three hours. Lectures and laboratory or field work, M W F, 8–1. Botanical Laboratory, Agronomy Building. Dr. EAMES.

Representative plants from all the larger plant groups will be studied. Emphasis will be placed on structure and life history, with particular attention to evolutionary relationship. Some attention will be given to the economic aspects of the different groups, and to their adaptation to surroundings. Field work will replace laboratory hours to some extent.

This is a general course aiming to serve as an introduction to the study of botany and as a preparation for advanced courses. It is planned to cover certain phases of college entrance requirements and of general secondary school botany. Laboratory fee, $1.

B. **Elementary Morphology of Seed Plants.** Credit, one hour. T Th, 2.30–5.30, with some additional reading. Botanical Laboratory, Agronomy Building. Professor WIEGAND and Mr. METCALF.

A study of the variation in form and structure of roots, stems, leaves, flowers, fruits, and seeds, together with the terminology concerned, and the advantages of these variations. Modified plant parts, pollination, and seed dissemination will receive attention. Fundamental internal structure will be briefly treated. Laboratory and field studies, conferences, recitations, and reading.

The course is arranged somewhat after the plan of Gray's Lessons in Botany, and is designed as a preparation for systematic field botany and for persons desiring a general knowledge of the common plants. It also covers certain phases of secondary school botany. Identification is not a feature of this course. Laboratory fee, $1.

C. **General Plant Physiology.** Credit, four hours. Prerequisites: all freshman work or its equivalent, and general botany. Lectures, daily except S, 9. Agronomy 192. Laboratory, daily except S, 10–12.30. Assistant Professor KNUDSON.

Lectures, recitations, laboratory work, reports, and occasional field studies. Topics include absorption, conduction, transpiration, metabolism, relation to environment, growth, reproduction, and propagative processes. Laboratory fee, $5.

D. Identification, Classification, and Ecology of the Higher Plants and Ferns. Credit, two hours. Prerequisite: some training in structural botany,

taken previously or in connection with this course. T Th, 8–1. Botanical Laboratory, Agronomy Building. Professor WIEGAND and Mr. METCALF.

A comprehensive study of the wild flora about Ithaca, with reference to the practical recognition of species and varieties as well as to the floral and foliar characteristics of these species and to the grouping of them into genera, families, and more comprehensive groups. The course consists of field and laboratory work, but is supplemented by general discussions and lectures on the broader question, of classification, nomenclature, distribution, and habitat. The ecological associations and modifications of the various species and varieties will be noted. The course is intended to supply teachers and others with a general knowledge of the flora. Some all-day trips are required. Supplementary instruction will be given in the preservation of material for the museum and for the herbarium.

If necessary this course will be divided as follows: A. For those beginning this type of work. B. For students who already possess some knowledge of the flora. Laboratory fee, $1.

E. **Trees and Shrubs.** Credit, two hours. Prerequisite: some training in structural botany, taken previously or in conjunction with this course. Hours by appointment. Agronomy Building. Dr. EAMES.

A course intended for those who desire more concentrated work on the woody plants of our flora than can be obtained in Course D. The aim is to familiarize the student with as many as possible of the trees and shrubs in the Cayuga Lake flora, their floral, and foliar characters, their structure, methods of growth, habits, distribution, and classification. Much of the work will be in the field, supplemented by laboratory practice, lectures, and demonstrations. Some all-day trips are required. Laboratory fee, $1.

F. **Methods of Teaching Elementary Botany.** Credit, one hour. Prerequisite: some training in general botany. M W, 2.30–5.30, with some additional reading. Botanical Laboratory, Agronomy Building. Mrs. WIEGAND.

Discussions, and field and laboratory practice. This course is designed for teachers of botany in grade schools and in high schools, especially for those beginning such work. Since its aim is to present methods of teaching rather than subject matter, it is planned for persons who already have a genera knowledge of botany or who are taking other summer school courses in the department. Elementary reference and textbooks will be discussed and compared. There will be practice in the collection and preservation of material for illustration, for classroom use, and for herbarium, also practice in performing simple physiological experiments. Outlines of elementary and high school courses in botany will be worked out and discussed, together with methods of presenting the work. The making of free-hand and microtome sections will be treated briefly as far as time will permit. Throughout, emphasis will be placed on the value and use of near-at-hand, familiar material in teaching.

On payment of the cost of glassware and other material used, the specimens collected and preserved will become the property of the student. Laboratory fee, $1.

G. **Research for Graduate Students.** (For students counting Summer Session as residence toward an advanced degree.) Professor WIEGAND.

Graduate students are advised to register in the Summer Term of the College of Agriculture, but in case this is impossible they may register in this course.

CHEMISTRY

A. **Agricultural Chemistry.** Credit ,four hours. Prerequisite: Chemistry 1, or its equivalent. Lectures, daily, 8. Morse Lecture Room 1. Recitations, M W F, 9. Morse Hall. Assistant Professor CROSS.

A general course treating of the relations of chemistry to agriculture. The following are among the subjects discussed: the chemical composition of agricultural plants and plant by-products; the chemical composition of soils; some chemical relations between the organic and the inorganic matter of soils; sources, preparation, and manufacture of the materials used in fertilizers; the chemical relations of lime to soils; the chemistry of insecticides and fungicides.

B. **Agricultural Chemistry.** Credit, two hours. Prerequisite Chemistry 1 and 6, or the equivalent. T Th, 2–5; F, 10–1; S, 9–12.30. Assistant Professor CROSS and Mr. RICE. Quantitative Laboratory, Morse Hall.

A laboratory course designed to accompany course A. Laboratory deposit, $15.

C. **Household Chemistry.** Credit, two hours. Prerequisites: Chemistry 1 and 6, or the equivalent. Lectures, daily except S, 10. Morse lecture room 3. Assistant Professor CROSS.

This course is designed especially for students in home economics. It treats of the chemistry of foods, beverages, baking chemicals, preservatives, and detergents.

D. **Household Chemistry.** Credit, three hours. T W Th F, 2–5; F, 11–1; S, 8–1. Quantitative Laboratory, Morse Hall. Assistant Professor CROSS and Mr. RICE.

A laboratory course designed to accompany course C. Laboratory deposit, $20.

DAIRY INDUSTRY

A. **Milk Composition and Tests.** Credit, three hours. Lectures, M W F, 8. Recitations, T Th F, 9. Dairy Building 222. Laboratory, M W F, 2–4.30. Dairy Building 232. Professor TROY and Mr. JONES.

This is equivalent to course 1 of the regular university year. The topics considered are the secretion and composition of milk, sampling, the use of the lactometer, the Babcock test for fat, acid tests, moisture tests, salt tests, tests for preservatives and adulterations. Laboratory deposit, $3.

B. **Dairy Industry.** Five periods. No credit toward graduation. Lectures, T Th, 10. Dairy Building 222. Laboratory, M W F, 10–1. Dairy Building 122. Professors STOCKING, ROSS, GUTHRIE, and FISK, and Messrs. MCINERNEY and PICKERILL.

This is a general course in dairy work covering the outline as given in the State Syllabus. It should be of value to teachers of dairy work in high schools. The course includes lectures and laboratory work in the following topics: nature of bacteria and their relation to dairy products; sources of bacterial contamina-

tion of milk and methods of prevention; pasteurization; use of bacteria starters; the Babcock test for fat in milk and milk products; the lactometer and its use; acid tests; sampling; composition of milk; milk preservatives and adulterations; standardization of milk; use of score cards for dairy farms and dairy products; dairy buildings, equipment, and utensils; handling of market milk; action of rennet; making of cottage cheese. Laboratory deposit, $3, part returnable.

ENTOMOLOGY

The following courses will be given throughout the six weeks of the Summer Session. Students qualified to enter the Graduate School, whether wishing to take up specific research in entomology or to do more general work in the subject, may arrange to begin their work before the opening of the Summer Session or to continue it after the close of the Session. Members of the staff in residence during this period will be glad to consult with and aid such students. Correspondence relative to special arrangements should be directed to Professor W. A. RILEY.

Laboratory fees will be charged in these courses, varying, with the nature of materials required, from 50 cents to $1.50 for each hour of academic credit.

A. **General Entomology.** Credit, two or more hours. Lectures, daily except S, 8. Main Building 392. Laboratory and field work, to the extent of one or more hours, may be elected in Course B. Hours by appointment. Main Building 391. Miss STRYKE.

An introductory course dealing with the biology, habits, economic importance, and relationships of insects.

B. **Laboratory Course in the Morphology and Classification of Insects.** Credit, two or more hours. Laboratory open daily except S, 8–5. Main Building 391. Miss STRYKE and Mr. COUTANT.

Study of the external anatomy of typical insect forms; the collecting, mounting, and classifying of representatives of all the orders and the chief families of insects. While the systematic work will give a general survey of the field, each student may direct his energies toward the collecting of any group in which he is particularly interested.

C. **Morphology and Development of Insects.** Credit, two or more hours. By appointment. Main Building 391. Professor W. A. RILEY.

A lecture and laboratory course designed for advanced students in entomology, and for those specializing in zoology.

D. **Insects and Disease.** Credit, one hour. For students desiring university credit, this course must be preceded or accompanied by courses A and B or their equivalent. Lectures and demonstrations, M W F, 12. Main Building 392. Professor W. A. RILEY.

A consideration of insects and their allies as the cause, and more especially as the conveyers and disseminators, of diseases of man and the higher animals. The object of the course is to afford a general survey of the field and to put the student in touch with the discoveries and theories that in very recent years have become important factors in the fight for public health, and in the case of certain diseases have completely revolutionized the methods of control. There will be abundant opportunity for laboratory work for those desiring special study along these lines.

E. **Research.** Opportunities will be offered for advanced work and research in various phases of entomology. Properly qualified students registered as candidates for advanced degrees may write a thesis under any member of the department who is in residence during the summer.

Seminary. M, 4.30. Main Building 392. The work of an entomological seminary is conducted by the Jugatae, an entomological club that meets for the discussion of current literature and of the results of investigations.

FARM CROPS

A. **Farm Crops.** Credit, three hours. Lectures, daily, 10. Laboratory, M W, 2–4.30. Agronomy Building 202. Mr. HARDENBURG.

A course covering the principal cereal and forage crops. The subject matter presented will be chosen especially to meet the needs of teachers of agriculture in high schools. Laboratory fee, $2.

FLORICULTURE

A. **General Flower Growing.** Credit, one hour. Lectures, T Th, 9. Main Building 232. Laboratory, M, 2–4.30. Greenhouses. Mr. PATCH and Miss MINNS.

This is designed as an elementary course to be of value for home garden or school garden work. It is outlined so as to acquaint students with the most valuable material for this line of work and to cover methods of propagation and culture. Lectures, and field and garden practice.

FORESTRY

B. **General Forestry.** Credit, two hours. Lectures, M T W F, 8. Forestry Building. Field work, F, 2–4.30. Professor SPRING.

This course covers briefly the general field of forestry. Its principal phases are exemplified in field excursions. The topics to be considered will include the principles and general methods of forestry; forest resources; the influence of the forest on stream flow and on climate; how to reproduce the forest and to maintain timber production; important phases of federal, state, and private forestry. Laboratory fee, 50 cents.

C. **Forestry for Schools.** Credit, two hours. Lectures, T Th S, 11. Forestry Building. Field work, T Th, 2–4.30. Professor SPRING.

A course in elementary forestry, primarily designed for teachers who desire to include forestry in their school work in nature study, botany, geography, history, civics, agriculture, or woodworking. The topics to be considered will include identification of the principal trees occurring in the northeastern United States; the recognition of the kinds of wood that are most common in the lumberyard and in the cabinet-maker's shop; collection and germination of forest tree seeds; raising forest trees in the school garden; natural distribution and characteristics of trees and forests; uses of wood and economic value of forests; history of federal and state forestry movements; relation of the state to forest conservation. Laboratory fee, 50 cents.

HOME ECONOMICS

The work is intended for persons desiring to teach, but is suited to others desiring to study, the principles of home making.

A. **Foods.** Credit, four hours. Lectures and recitations, daily except S, 11. Home Economics Building 105. Laboratory practice, daily except S, 2–5. Home Economics Building 200. Written review for those wishing credit in this course, S, 11. Misses BROWNING and KNOWLTON.

A course for establishing a fundamental knowledge of foods. The lectures will include a discussion of the sources, composition, and characteristics of foodstuffs; principles governing the selection of foods and methods of preparing them; food preparation and preservation; table-setting and serving; comparative nutritive values and costs of various foods. The laboratory work will follow the lectures closely, and will consist of experiments in determining the characteristics of foodstuffs and practical problems in the preparation of food for the table. Laboratory fee, $5.

B. **Human Nutrition.** Credit, three hours. Lectures and recitations, daily except S, 12. Home Economics Building 105. Laboratory practice, M W F, 2–5. Home Economics Building 300. Written reviews for those wishing credit in the course, S, 12. Professor ROSE and Miss BROWNING.

This course will include discussion of the fundamental principles of nutrition as these apply to the human being; the practical means of applying scientific principles in planning dietaries; special problems of nutrition, as the feeding of infants and children. The laboratory work will consist of exercises in determining the comparative cost and nutritive value of various foods; in planning and judging various types of dietaries; in preparing typical meals. Open only to students who have had course A or its equivalent. Laboratory fee, $4.

C. **Household Management.** Credit, two hours. Lectures, M W F, 8. Home Economics Building 105. Laboratory, T Th, 8-11. Home Economics Building 400. Written reviews for those desiring credit in the course, S, 8. Professor VAN RENSSELAER and Miss KNOWLTON.

The course is both theoretical and practical. Lectures will discuss division of income, household accounts, factors in cost of living from the housekeeper's standpoint, domestic service, household equipment, and means for saving labor. Laboratory practice will consist of experimental work in cleaning, use of equipment, and general management of the house. Laboratory fee, $1.

D. **Household Sanitation.** Credit, one hour. Lectures and recitations, M W F, 10. Home Economics Building 100. Miss KNOWLTON.

Household bacteriology; cleanliness of soil, air, water, food; disposal of waste; insect pests, infection, immunity, methods of disinfection; good housekeeping in relation to public health; healthful living to promote efficiency; physical exercise and rest.

E. **Extension in Home Economics.** Credit, one hour. Lectures, T Th, 8. Home Economics Building 105. Professor VAN RENSSELAER.

Principles of extension work with special reference to rural communities; organization; material to be presented; manner of presentation; speaking; writing. Practice problems in rural communities.

F. **Sewing.** Credit, four hours. Lectures, daily except S, 10. Home Economics Building 305. Laboratory practice, daily except S, 8–10. Home Economics Building 300.

A course designed for those who are to teach in the public schools. It includes a study of the economic standards for the production and selection of clothing; hygiene of clothing; principles of art in relation to dress; instruction in drafting, cutting, and plain and machine sewing. Laboratory fee, $5, part returnable.

G. **School Methods in Home Economics.** Credit, one hour. Lectures and conferences, M W F, 9. Home Economics Building 105. Miss BROWNING.

Relation of home economics to education; place of home economics in the school curriculum; preparation for teaching; relation of home economics to physical and social sciences; art; literature of home economics; method of presentation; equipment; relation to life of the community.

Household Chemistry. See page 60.

METEOROLOGY

A. **Meteorology and Climatology.** Credit, two hours. Lectures, M W F, 11. Dairy Building 222. Laboratory, W, 2–4.30. Main Building 202. Professor W. M. WILSON and Mr. HAUSMAN.

This course is adapted to the needs of teachers of agricultural subjects in which weather and climate are important factors, and teachers of physical geography. It is designed to acquaint the student with the general and secondary circulation of the atmosphere, and the development, progression, and conditions that attend cyclones, tornadoes, hurricanes, and other special phenomena. Attention is given to the construction of weather and climatological charts and to the use and care of meteorological instruments. The principles of meteorology are applied to practical weather forecasting by the aid of the telegraphic reports, received through the cooperation of the United States Weather Bureau. The relation of weather and climate to agriculture is considered. The laboratory practice consists of a systematic study of the principal weather and climatic elements with the aid of maps, charts, and a laboratory manual.

NATURE STUDY

A. **General Nature Study.** Credit, two hours. Lectures, M W F, 9. Field and laboratory observations, T Th, 10–12.30. Main Building 302. Assistant Professors COMSTOCK and EMBODY.

The object of this course is to train teachers in making personal observations alorg several lines of nature study and to give them a foundation for carrying on the work independently. As many as possible of the laboratory periods will be spent in the fields in the study of birds, trees, and plants. Special attention will be given to observing the relation of insects to flowers of field and garden. The lectures will supplement the field and laboratory work, and will also present practical methods for conducting nature study in the grades, including plans for breeding cages and aquaria; and one lecture will be given each week on nature literature.

B. **Natural History of the Farm.** Credit, one hour. Lectures, M, 8. Main Building 292. Field work, sec. A, T Th, 2–5; sec. B, W F, 2–5. Assistant Professor EMBODY.

This is primarily a field course, treating principally of the wild inhabitants of the fields, woods, marshes, and streams of the farm. Wild organisms will be compared with domesticated or cultivated ones, and the availability of certain wild forms for cultivation will be pointed out.

The following topics, among others, will be studied: wild fruits, wild roots, wild cereals, deciduous trees, evergreens, pasture plants and their fitness for pasture conditions, wild birds, wild mammals, and fishes and other inhabitants of the farm stream.

Each student will be required to do a considerable part of the work individually. Field reports must be handed in weekly and these will be carefully graded. Laboratory fee, $1.

PLANT BREEDING

A. **Principles and Practice of Plant Improvement.** Credit, one hour. Lectures, T Th, 9. Laboratory and field practice, T, 2–4.30. Forestry Building. Professor GILBERT.

This is an elementary course designed primarily for teachers. The laws underlying plant breeding—variation, heredity, and general evolution—will be carefully considered. The course will be made as practical as possible and will give specific information for the teaching of plant breeding in elementary and high schools. Ample opportunity will be given for making hybrids, collecting wild and cultivated plants, and similar exercises that have proved valuable and interesting to school children. Laboratory fee, 50 cents

PLANT PATHOLOGY

A. **Plant Pathology.** Credit, three hours. Prerequisite: elementary botany, 5 or 6 hours. Recitations or lectures, M W F, 8. Laboratory, daily except S, 2–4.30. Auditorium, basement. Assistant Professor FITZPATRICK and Mr. CHUPP.

A fundamental course in plant pathology treating of the common diseases of cultivated plants, their nature, cause, and control. Laboratory fee, $4.50, plus a breakage deposit of $2.

B. **Identification of Mushrooms and Disease-inducing Fungi.** Credit, one hour. Lecture, T, 8. Laboratory, T Th, 9–12. Auditorium, basement. Assistant Professor FITZPATRICK and Mr. CHUPP.

Especially designed for teachers who desire a working knowledge of the common mushrooms and disease-inducing fungi that occur in this region. This work will consist mainly of collecting trips for a part of the morning, followed by laboratory study and identification of the material collected. Teachers will find the facts and material thus collected of special service in nature study teaching and in the teaching of agriculture in high schools. Laboratory fee, $1.50, plus a breakage deposit of $2.

POMOLOGY

A. **Gene ralFruit Growing.** Credit, three hours. Prerequisite: Botany 1, or its equivalent. Regular students who are planning to take additional work in pomology should not elect this course. Lectures, daily except S, 11. Recitations, T Th, 9. Main Building 292. Laboratory, S, 8–10.30. Main Building 202. Professor C. S. WILSON and Assistant Professor KNAPP.

A study of the methods of propagation and early care of commercial fruits, including the growing of seedlings, cuttings, and layers; principles of budding, grafting, pruning, and planting; soils, varieties, and planting plans for the orchard; cultivation, cover crops, fertilization, spraying, pruning, and thinning, as practiced in orchard management; picking, grading, packing, storing, and marketing of fruit. This course considers the apple, pear, quince, cherry, plum, apricot, and peach, and the nuts.

B. **Small Fruits.** Credit, one hour. Lectures, M W, 9. Recitations, F, 9. Main Building 292. Professor WILSON.

A course considering the grape, raspberry, blackberry, dewberry, currant, gooseberry, and strawberry. The topics discussed are soils, varieties, propagation, planting, culture, picking, grading, packing, and marketing.

C. **Advanced Pomology.** Credit, one hour. Prerequisites: Botany 1 and Pomology A, or the equivalent. Lectures, T Th, 10. Main Building 292. Laboratory, T, 2–4.30. Main Building 202. Assistant Professor KNAPP.

The course includes a comprehensive study of varieties; the judging of fruits; the preparation of planting and working plans; a study of the characters and botanical relationships of the fruits of the United States. Each student is required to collect and mount a number of varieties and species. A trip to Geneva will occupy one afternoon or a Saturday sometime during the course.

POULTRY HUSBANDRY

A. **Poultry Feeding, Poultry House Construction, and Poultry Management.** Credit, one hour. Lectures, M W, 9. Poultry Building 375. Laboratory, T, 2–4.30. Poultry Building 300. Professor RICE and Mr. KENT.

This is an introductory course taking up briefly the following subjects: anatomy; physiology of digestion and reproduction; principles and practice of feeding for egg production; fattening; rearing; incubating; brooding; the selection and business organization of the poultry farm; principles of poultry-house construction and design; building materials; building construction; laying out foundations; concrete construction; estimates; visits to poultry buildings. Laboratory fee, $1.

C. **Poultry Breeds, Breeding and Judging.** Credit, one hour. Lectures, T Th, 9. Poultry Building 375. Laboratory, Th, 2–4.30. Poultry Building 300. Mr. KENT.

This course takes up briefly a general discussion of breeding; characteristics of the breeds of poultry; nomenclature; types; feather markings; judging for constitutional vigor, utility, and standard points. Laboratory fee, $1.

D. **Marketing Poultry and Poultry Products.** Credit, one hour. Lectures, F S, 9. Poultry Building 375. Laboratory, F, 2–4.30. Poultry Building 300. Mr. BENJAMIN.

The subjects discussed at the lectures and applied in the laboratory are cleaning, testing, grading, packing, and marketing eggs; killing, picking, packing, and marketing poultry; judging eggs and dressed poultry; preservation and storage of eggs and poultry; preparation of poultry for the table, including drawing, shaping, trussing, deboning, and carving. Laboratory fee, $1.

RURAL ECONOMY

A. **Agriculture.** No credit toward graduation. Lectures, daily except S, 8. Home Economics Building 100. Professor LAUMAN.

A brief general survey of agriculture in its technical, economic, social, and historical aspects. Designed to give a view of the whole field of agriculture.

B. **Rural Economy.** Credit, two hours. Prerequisites: junior standing and Political Science 51. Lectures and reports, daily except S, 11. Home Economics Building 100. Professor LAUMAN.

A study of the general economic problems of agriculture.

RURAL EDUCATION

F. **The School.** Credit, one hour. Lectures and conferences, M W F, 10; repeated, T Th S, 8. Rural Schoolhouse. Miss MCCLOSKEY and Mr. TUTTLE.

This course will suggest methods of instruction in elementary agriculture and nature study, taking as a basis the work outlined in the New York State Syllabus for 1914–15. Simple apparatus to be used in teaching country-life subjects will be shown and discussed. Other subjects of lectures and discussions will be as follows: gardening in education; field work; natural history collections; neighborhood studies; the school and the home; recreation in country districts; dramatic entertainments; agricultural contests; the county fair; small school exhibits; additions to the school library; the school grounds; Arbor Day; Corn Day; and similar topics of interest to grade teachers, training-class teachers, district superintendents, and all persons interested in introducing country-life subjects into schools.

G. **Methods in Elementary Agriculture.** Credit, one hour. Lectures, demonstrations, and discussions, M W F, 8. Main Building 232. Professor WEEKS.

This course is designed for elementary school teachers who desire a knowledge of methods of teaching agriculture adaptable to the conditions under which they work.

H. **Methods of Teaching High School Agriculture.** Credit, one hour. Lectures and discussions, T Th S, 10. Main Building 232. Professor WORKS.

This course is intended for teachers who have had some technical agriculture and desire help in methods of presentation.

SOIL TECHNOLOGY

C. **Soils.** Three periods. No credit toward graduation. Lectures, M W, 9. Round-table for discussion and demonstration, S, 9. Home Economics Building 100. Assistant Professor BUCKMAN.

A practical, fundamental course in soils. The subject will be handled with special reference to the needs of those expecting to teach soils in secondary schools. The lectures will include a discussion of the formation and classification of soils, tilth, soil moisture, soil biology, soil amendments, manures and fertilizers, and practical soil management. The round-table once a week will give opportunity for questions and practical discussions as to methods of demonstration.

VEGETABLE GARDENING

A. **Vegetable Gardening.** Credit, one hour. Lectures, W F, 8. Laboratory, F, 2–4.30, Home Economics Building 370. Messrs. WORK and DIMON.

This course is designed primarily for teachers, and it is the purpose that the student shall acquire such a knowledge of vegetable plants and their management as will enable him to conduct school work advantageously. The lectures will discuss the scope of vegetable gardening; its home and commercial importance; the location, planning, and management of school, home, and commercial gardens; the crops and their special requirements. The laboratory work will consist chiefly of practical studies in the gardens of the department and in individual gardens. Laboratory fee, $1.50.

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These publications include

Catalogue Number (containing lists of officers and students), price 25 cents,

Book of Views, price 25 cents,

Directory of Faculty and Students, Second term, 1913–14, price 10 cents,

and the following informational publications, any one of which will be sent gratis and post-free on request. The date of the last edition of each publication is given after the title.

General Circular of Information for prospective students, February 1, 1914.

Announcement of the College of Arts and Sciences, May 15, 1913.

Announcement of Sibley College of Mechanical Engineering and the Mechanic Arts, January 1, 1914.

Announcement of the College of Civil Engineering, February 15, 1914.

Announcement of the College of Law, April 15, 1913.

Announcement of the College of Architecture, June 1, 1913.

Announcement of the New York State College of Agriculture, June 15, 1913.

Announcement of the Winter Courses in the College of Agriculture, July 1, 1913.

Announcement of the Department of Forestry, July 15, 1913.

Announcement of the Summer Term in Agriculture, April 15, 1914.

Announcement of the New York State Veterinary College, April 1, 1914.

Announcement of the Graduate School, January 15, 1914.

Announcement of the Summer Session, March 15, 1914.

Annual Report of the President, November 1, 1913.

Pamphlets on scholarships, fellowships, and prizes, samples of entrance and scholarship examination papers, special departmental announcements, etc.

Correspondence concerning the publications of the University should be addressed to

The Secretary of Cornell University,
Ithaca, New York.